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ABSTRACT

This document is a review and study of current and prospective telecommunication policies in 17 countries with regard to the competitive market access those policies foster or promise. It explores the policies of each country toward information flow that will also have an impact on international competition. The aim of the study is to identify the degree of competitive access allowed U.S. companies in the provision of telecommunications and information products and services. The study profiles each of the selected countries with main attention given to the following: (1) organizational structures; (2) services structure and policies; (3) data and telephone services; (4) international services structure and policies; (5) new services; and (6) future competitive access. The 17 countries profiled are Australia, Austria, Belgium, Brazil, Canada, Federal Republic of Germany, France, Hong Kong, Italy, Japan, Mexico, Philippines, Singapore, Sweden, Switzerland, United Kingdom, and Venezuela. Information on all 17 countries is presented in three tables: Major Telecommunications Entities by Country; Market Structures by Service Categories by Country; and Equipment Market Structures and Approval Authorities by Country. (JB)

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TELECOMMUNICATION POLICIES IN SEVENTEEN COUNTRIES: PROSPECTS FOR FUTURE COMPETITIVE ACCESS

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U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

David J. Markey, Assistant Secretary-Designate
for Communications and Information

May 1983

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PREFACE

This review and study of current and prospective telecommunication policies in seventeen countries with regard to the competitive market access these policies foster or promise was performed for the National Telecommunications and Information Administration (NTIA) by MarTech Strategies, Inc.

The principal investigator was Ronald S. Eward of MarTech Strategies, Inc. We wish to recognize the assistance of L. Daniel O'Neill in preparing initial drafts of certain countries. We also extend our appreciation to Jack E. Cole and Richard J. O'Rorke, Jr., of NTIA who have contributed many insights and useful reviews. Last but not least, we thank the many comments and contributions from officials in most of the countries who cared and took the time and patience to make corrections or offer suggestions. Notwithstanding, MarTech is responsible for the material and judgments in this report. The reader should also remember that the state of these policies is a fluid situation and can change from that presented here.

INTRODUCTION AND OVERVIEW

Statement of Work

International telecommunications and information services are cooperative ventures between the United States and other sovereign nations. Thus, the United States cannot unilaterally mandate policies, structures or market opportunities in the international arena. While reliance on market forces and the broadest possible exchange of information serve as the basis of communications policy in the United States, this is not generally the case in foreign countries or between foreign countries and the United States. In most other countries, telecommunications equipment and service offerings, rates and conditions, are usually controlled by a government monopoly, whose motivations and objectives may be different than in the United States. Thus, while the United States may believe that competition and open access to information is a desired policy, many foreign administrations favor an environment of greater control of the flow of information and access to domestic equipment markets.

While some changes in policy toward competition in telecommunications have been noted in the case of a few countries, the intentions of the majority of countries remain uncertain. In addition, a number of countries are now developing their policies toward information flow, which also have significance for international competition. This study explores these developments in 17 selected countries with the overall aim of identifying the degree of competitive access allowed U.S. companies in the provision of telecommunications and information products and services.

Toward this end, the study profiles each of the selected countries with main attention paid to the structure and policies, both present and prospective, that will govern the degree of competitive access allowed U.S. companies in the provision of telecommunications and information products and services. The parameters of interest include:

1. The present organizational structure, showing the entities responsible for:

   - the provision of telecommunications services;
   - the provision of the major categories of telecommunications equipment, including customer premises equipment, and any approval necessary for the use of foreign produced equipment;
   - regulations and policies affecting international information flow, such as in-country and foreign information processing by computer and technology transfer.

2. The present governmental policies concerning the provision of domestic and international telecommunications service, including the following:

   - Message Telephone Service
   - Leased Channel Service
   - Data Transmission
   - Remote Data Processing
   - Video Teleconferencing

3. The present governmental policy, other related policy developments, and type approval processes controlling the provision of the major categories of foreign-produced telecommunications equipment, including customer premises equipment and its interconnection with public networks.

4. The present governmental policies on information processing, other than data protection legislation, such as limitations on where data may be stored or processed, restrictions on the use of transmission facilities for the purpose of processing data outside the country, and the policies on valuation and taxation of imports of software.

5. Any differences in the policies identified above in how they apply to U.S. traffic or service/hardware providers as opposed to how they are applied to other countries.

6. Future plans, if any, to expand competitive access to U.S. firms in the areas mentioned above, and identify any cases where such changes have already taken place during the past five years.

7. The views of users, overseas consumer groups, or professional organizations in each country, if any, relative to specific needs for competition, lower rates, increased service offerings, and information services which may affect government policies in the future.

The countries included in this study are:

Australia
Austria
Belgium
Brazil
Canada
Federal Republic of Germany
France
Hong Kong
Italy
Japan
Mexico
Philippines
Singapore
Sweden
Switzerland
United Kingdom
Venezuela

These countries were selected for consideration on the basis of:

1. size of international traffic volume;

2. geographic location; or,

3. prominence in information activities.

Overview

The focus of this study is on the individual countries with emphasis on each nation's particular environment and set of policies governing prospective greater reliance on market competition and foreign competitive access. The study is not a comparative analysis, per se, although comparative observations can be made if care is taken* Notwithstanding, it is felt that it would be instructive and helpful to the reader to summarily compare the countries in an overview fashion to, at least, demonstrate the preponderance of structures and policies existent in the international environment. We emphasize again, though, that it is each country's individuality that is important in this study and not comparative abstraction.

Market Structure Models

For purposes of this limited comparative overview, we recognize and distinguish six (6) possible market structures. The models and their differentiating characteristics are:

1. Government Monopoly (GM) -- The classic case of a monopoly vested in a government Ministry or department. This monopoly may be based in law or by administrative fiat or convention;
2. Government Monopoly--Public Corporation (GM-PC)--government monopoly but instituted through public corporation form rather than departmentally;
3. Government Competition(GC)--a structure wherein both the government and private sector entities compete with each other in the market.
4. Regulated Monopoly (RM)--the classic case of private ownership of facilities (one entity) with regulation by government department.
5. Regulated Competition(RC)--the extent of competition, the number of competitors, the products or services that can be offered by each are all subject to authorization, licensing, type-approval, and the like, by a government department or agent of the government.

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*This qualification is necessary because of the importance of the individual aspects. Two countries may be similar in most or all the underlying conditions and, therefore, might seemingly lead to the same conclusion with regard to competitive access. This is not necessarily the case. On an abstract level, Japan and France and Italy appear as government monopolies with both standards-setting and approval authority vested in the PTT or MPT, yet the degree of competitive access varies due to individual circumstances (such as the bilateral agreements with Japan) and differing national pressures.

6. Liberalized Entry(LE)--a market situation characterized by the absence of all official government rules and regulations that serve to regulate market entry, structure or conduct coupled with complete reliance on private sector entities for the provision of goods and services. This situation can include minimal government requirements for, say, notification or meeting independent (non-government) standards. However, if these are more than minimal or used to influence or control entry, structure or conduct, then the case is one of regulated competition and not liberalized entry.

At the extreme, the absence of even minimal government requirements, save general reporting requirements (i.e., tax, etc.) would create a market structure of free entry.

The 'liberalized entry' structure does not account for unofficial government controls, hidden tariff barriers nor implicit bars on foreign ownership or participation. Thus, a nation could have a liberalized entry policy for domestic purposes yet appear as regulated competition or denied market access from a foreigner's standpoint. The same applies to regulated competition. This may apply only to domestic entities and not foreign. For example, both Canada and the U.K. have a 'regulated competition' market structure (two carriers) for inter-city services with no intent of licensing further providers or foreign providers. Strictly speaking, this is 'regulated competition' as opposed to 'regulated monopoly' but, from a U.S. firm's point of view, it is a regulated quasi-monopoly with little chance of market entry given the current policy toward foreign participation in such services.

Table 1 identifies the major telecommunication entities by country. Included are both the main service entity as well as the principal policy or regulatory agency. Also shown is the general market structural model applicable to each country. One sees that thirteen (13) of the seventeen countries operate under the principle of government monopoly whether through a ministry or public corporation. Two countries, Canada and the U.K., operate under a combination of government monopoly and regulated competition. One is a regulated monopoly (Hong Kong) and one (Philippines) operates under regulated competition.

TABLE 1

MAJOR TELECOMMUNICATION ENTITIES BY COUNTRY

	MAJOR TELECOMMUNICATION SERVICES ENTITY	STRUCTURAL FORM	POLICY OR REGULATORY OVERSIGHT ENTITY	STRUCTURAL FORM	GENERAL MARKET STRUCTURAL MODEL
Australia	Australian Telecommunications Commission (Telecom) - Domestic Overseas Telecommunications Commission Australia [OTC(A)]-International	Independent Statutory Authorities within Ministry of Communications	Minister for Communications	Government Ministry	GM
Austria	Post - und Telegraphenverwaltung (Austrian PTT) - Domestic. Radio Austria AG-International	Government Ministry Gov't Corporation	Austrian PTT	Government Ministry	GM GM (PC)
Belgium	Regie des Telegraphes et des Telephones (R.T.T. or "Regie")	Government Department	Minister of Posts Telegraphes and Telephones	Government Ministry	GM
Brazil	Telebras and Local Companies Intrastate and local EMBRATEL - Interstate and International	Public Corporation Public Corp. (97%)	Ministry of Communications	Government Ministry	GM(PC)
Canada	Provincial Government Companies Bell Canada TCTS and CNCP Teleglobe Canada	Public Corporation Private Corporations or Association (TCTS) Government Corporation (100%)	Provincial Public Utilities Boards Canadian Radio - Television and Telecommunications Commission (CRTC) Dept. of Communications	Provincial Gov't Agency, Federal Regulatory Agency Gov't Department	GM RC GM(PC)

CODE

GM = Government Monopoly - Government Ministry or Department.
GM(PC) = Government Monopoly (Public Corporation)
GC = Government Competition

RM = Regulated Monopoly
RC = Regulated Competition
LE = Liberalized Entry
*FE = Free Entry (Reference Point Only)

TABLE 1 Con't.

	MAJOR TELECOMMUNICATION ENTITY	STRUCTURAL FORM	POLICY OR REGULATORY OVERSIGHT ENTITY	STRUCTURAL FORM	GENERAL MARKET STRUCTURAL MODEL
France	Direction Generale des Telecommunications (DGT)	Government Department	Minister of Posts and Telecommunications	Government Ministry	GM
F. R. Germany	Deutsche Bundespost (DBP)	Government Department	Federal Minister of Posts and Telecommunications	Government Ministry	GM
Hong Kong	Hong Kong Telephone Co., Ltd.-Domestic Cable and Wireless (H.K.) Ltd.-Int'l.	Public Corporation Public Corporation (20%)	Hong Kong Post Office	Government Department	RM
Italy	ASST - DCST STET Group (SIP, Italcable Radiostampa, Telespazio)	Public Corp. (100%) Gov't Dept. Public Corp. (65%)	Ministry, Posts and Telecommunications	Government Ministry	GM GM(PC)
Japan	NTT - Domestic KDD - International	Public Corp.(100%) Public Corp.(100%)	Ministry of Posts & Telecommunications	Government Ministry	GM(PC)
Mexico	TELMEX - Local and Long-Haul Directorate General for Telecommunications - Int'l and Long-Haul	Public Corp. (51%) Gov't Dept.	Secretariat of Communications and Transport (SCT)	Government Department	GM(PC) GM

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TABLE 1 Con't.

	MAJOR TELECOMMUNICATION ENTITY	STRUCTURAL FORM	POLICY OR REGULATORY OVERSIGHT ENTITY	STRUCTURAL FORM	GENERAL MARKET STRUCTURAL MODEL
Philippines	Philippine Long Distance Telephone Co. (PLDT) and various private companies Bureau of Telecommunications (BUTEL)	Private Corp. Gov't. Dept.	National Telecommunications Commission Ministry of Transportation and Communication	Regulatory Agency Gov't Ministry	RC
Singapore	Telecommunications Authority of Singapore (Telecoms)	Public Corp. (100%)	Telecoms	Gov't Public Corporation	GM(PC)
Sweden	Swedish Board of Telecommunications (Televerket)	Public Corp. (100%)	Televerket's Board Ministry of Transport and Communications	Board of Directors Gov't Ministry	GM(PC)
Switzerland	Director-General, Telecommunications of Swiss PTT Radio-Suisse SA-Int'l.	Government Department Public Corp. (97%)	Federal Dept. of Transport, Communications and Energy	Gov't Dept.	GM GM(PC)
United Kingdom	British Telecommunications	Public Corp.(100%)*	Secretary of State for Industry	Gov't Dept.	GM(PC) RC
Venezuela	CANTV	Public Corp. (100%)	Ministry of Communications	Gov't Ministry	GM(PC)

*Pending legislation to change this percentage.

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Market Structure Mix

It may not always be appropriate to associate a country with just one of the market structure models. Often, this presents no problem as, indeed, the same structure may apply across the board, or, at least, for most practical purposes, apply to most market segments.

Upon careful examination though, we were struck by the emptiness (for some purposes) of too high a level of generalization as it creates a gross characterization that obscures the actual mix of market structures and organizations that may be at work simultaneously within a country. This is especially bothersome when one wants to examine service competitive access. In important cases, the structure may vary by specific service categories. 'Service' is too broad a term; association of a country with its dominant organization structure may obscure potential competitive access and opportunities. A particular country may observe certain sectors as government monopolies yet adopt more market oriented structures for other sectors. This mix of structures is present in both service and equipment markets. Momentarily, we will see the structural mix present for different service categories in some countries.

Some Definitions

As stated earlier, a focal point of this assessment is the identification of the prospect for greater reliance on market competition (as a partial or complete substitute for government monopoly) and associated foreign (particularly, U.S.) competitive access.

To provide some degree of rigor to this assessment, it is useful to think in terms of movement along a continuum of market structure models. The notion of "greater competitive or market access" is associated directly with movement along this continuum. There is naturally greater market access for private industry participating in a situation characterized by 'liberalized entry' than there is under 'regulated competition' which, in turn, is greater than under a regime of 'government monopoly' under which there is no competitive access. This is depicted in Figure 1.

At this time, we will also understand and use the term "status quo" to denote a continuation of existing policies. The designation of status quo does not mean necessarily the absence of market forces or competitive access. It simply means the absence of "greater" competitive or market access.

Liberalization is taken to mean more open market access.

The term 'restricted market access' would refer to situations or countries characterized by less competitive access.

If we treat multiple service categories and the equipment market[*] as discrete market segments or sectors, we can contemplate "greater" or "restricted" market access within a single market segment or across multiple segments. Thus, a country could be generally status quo with respect to most market segments but allowing expanded or greater market access within a specific service or equipment category (segment). It should be noted that if we're dealing with policy changes that affect multiple market segments, we are, in fact, dealing with major structural changes in a country's telecommunication organization structure. Few countries have or are considering major structural changes. Most changes occur within selected market segments.

[*] Which could be segmented further by major categories of equipment.

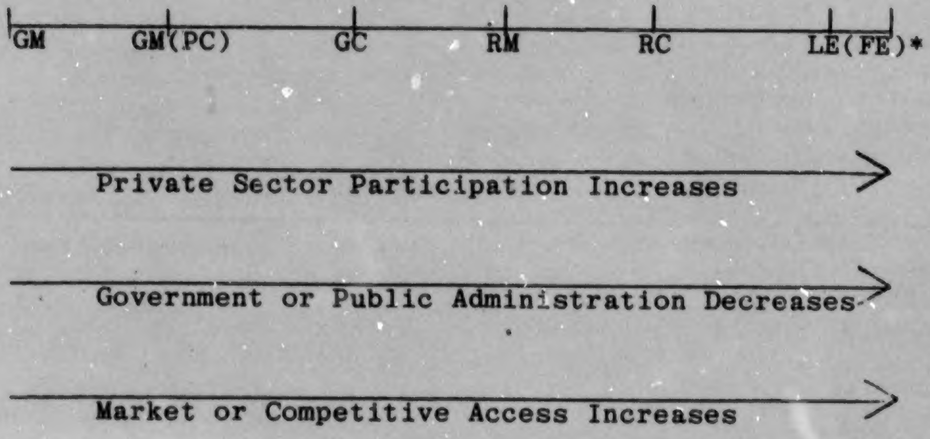
GM
GM(PC)
GC
RM
RC
LE(FE)*
Private Sector Participation Increases
Government or Public Administration Decreases
Market or Competitive Access Increases

FIGURE 1

CONTINUUM OF MARKET STRUCTURE MODELS

CODE

GM = Government Monopoly - Government Ministry or Department

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GC = Government Competition

RM = Regulated Monopoly

RC = Regulated Competition

LE = Liberalized Entry

*FE = Free Entry (Reference Point Only)

Major Findings: Service Structures and Competitive Access

Four countries are seen to have instituted, in part, (Canada and the United Kingdom), or, are seriously considering (Australia and Japan) structural changes in the way in which telecommunication and information services are provided. It is important to note that the Canadian and U.K. changes cannot be considered 'deregulation' as we use the term in the U.S., but introduction of limited forms of selective service competition. The markets are not open to anybody who wishes to supply. Government authorization and licensing are required. Furthermore, it is clear that neither country intends to authorize more than two interexchange service providers in the near term, anyway. This 'duopoly' may be better than a monopoly but should not be viewed either as a wide open, deregulated market situation.

Reform commissions in Japan and Australia have made some far-reaching recommendations but they must be considered just that. In the case of Japan, it appears that they are seriously considering competitive telecommunication market structures. In fact, we anticipate more competitive structures in Japan although it will probably not be as radical as recommended. In the case of Australia, the market concepts are there (in the Davidson Report) but the prospects for their implementation are diminishing as broad based opposition mounts and a new labor government takes control.

As far as significant adoption or potential adoption of at least some market forces goes, these four countries are the main instances among the seventeen countries. This represents slightly less than 25% of the nations considered.

Although not a major overhaul by any means, some key changes have taken place in a fifth country--Sweden--that warrant explicit recognition as this could provide a model for extending fair trade and fair competition principles on a broader scale. Sweden's Televerket, by an Act of Parliament (1980) and policy changes, has recently taken steps to structurally separate competitive activities from monopoly activities and adopted a more positive stance toward equipment liberalization. Though not a major reorientation of philosophies, such changes are to be welcomed as they promote fairness and accountability in some segments of the global telecommunications market.

Most of the remaining countries in this study will retain policies and structures that are, essentially, status quo. This, remember, may encompass sectors that are already relatively liberalized. For example, France and the Federal Republic of Germany can be expected to reaffirm their network monopolies while also reaffirming their reliance on private industry (authorized and type-approved) for terminal equipment. The point is that no further liberalization is anticipated over those conditions already present. Thus, no greater degree of market access is foreseeable; the situation will be one of status quo.

Some countries indicate a trend of more restricted market access as a result of "buy national" policies, industry "rationalization" efforts, industry regulation or enheightened regulation of telecommunication and information activities. Countries experiencing these market restrictive forces include Brazil, Mexico and the Philippines.

Selective Market Access

Whereas major structural revisions are few, we find selective competitive access in certain market segments. We have attempted to break down services into specific categories in relation to the specific market structure model associated with that service's provisioning. Although it wasn't possible to complete for all cases, sufficient results are available to demonstrate the market structure mix that exists in various countries.

Market Structure by Service Category

The structural mix concept, introduced earlier, becomes vivid when considered against those service categories, identified in Table 2. For some of the countries, the general structure applies in most cases. Particularly for the developed countries and the more mature markets, one finds more structural mix among the designated service categories. There may exist, as in the cases of Canada, the U.K., Japan, France, for example, government monopoly for one set of services, regulated competition for another, liberalized entry for still another. Thus, one should be careful in generalizing about service competitive access. It is not a simple yes or no where one finds either there is service market access or there is not service market access. What one finds is that for certain service categories, there is no prospect for competitive access while, for others, there may be windows of opportunity. They are only windows as one does not find, generally speaking, wide open doors to foreign service markets.

TABLE 2

MARKET STRUCTURES BY SERVICE CATEGORIES BY COUNTRY

	AUSTRALIA	AUSTRIA	BELGIUM	BRAZIL	CANADA	FRANCE	F.R.GERMANY	HONG KONG
Exchange or Local	GM	GM	GM	GM(PC)	GM	GM	GM	RM
Inter-Exchange or Long-Haul	GM	GM	GM	GM(PC) Interstate	RC(2)^2	GM	GM	RM
International	GM	GM(PC)	GM	GM(PC)	GM	GM	GM	RM
Resale	NO	NO	NO	NO	NO	NO	NO	NO
Shared Use	NO	Within legal entity	NO	NO	NO	NO	NO	
Value Added Domestic International	RC	LE LE	RC	GM(PC) RC	LE LE	GM RC	GM RC	
Data/T Services		LE/RC	LE	RC,GC,GM	RC	RC	RC	
Info Providers Domestic Foreign		LE			LE RC	LE RC		

1. Fewer carriers or providers anticipated.
2. No additional entrants anticipated.

CODE

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TABLE 2 - Con't

MARKET STRUCTURES BY SERVICE CATEGORIES BY COUNTRY

	ITALY	JAPAN	MEXICO	PHILIPPINES	SINGAPORE	SWEDEN	SWITZERLAND	UNITED KINGDOM	VENEZUELA
Exchange or Local	GM GM(PC)	GM(PC)	GM(PC)	RC	GM(PC)	GM(PC)	GM	GM(PC) Future local competition possible via cable (but non-voice)	
Inter Exchange or Long-Haul	GM GM(PC)	GM(PC)	GM(PC)	RC	GM(PC)	GM(PC)	GM	RC(2)[2]	
International	GM(PC)	GM(PC)	GM	RC	GM(PC)	GM(PC)	GM	GM(PC) Marginal RC	
Resale	NO	Partial	NO	NO		NO	NO	NO	
Shared Use	NO	Yes	NO	NO		NO	NO	NO	
Value Added									
Domestic	GM	GM(PC)							
International	GM(PC)	RC	GM		GM(PC)			RC	
Data/TS Services		GC/LE	RC					GC/LE	
Providers Domestic Foreign		LE LE						LE	

1. Fewer carriers or providers anticipated.
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A review of Table 2 reveals that telecommunication services--exchange, interchange, international and their resale or shared use--are and will, by and large, remain subject to government monopoly provisioning. There is one instance of 'regulated monopoly' (Hong Kong) and one of 'regulated competition' (Philippines). Canada and the U.K. are seen to practice partial regulated competition along with segments of government monopoly. U.S. access to these telecommunication service market segments is not anticipated as there are no plans to license foreign service providers (in these categories). An exception might be in satellite ventures where Japan and Australia may allow some U.S. participation.

We further note that even in those cases where there does exist some movement or contemplation toward selective competition in some service segments, monopoly control and provisioning of international service is retained or contemplated except for the limited international access provided the new service provider (Mercury Communications) in the U.K. British Telecom is still the sole entity as far as international negotiations and arrangements are concerned.

The review finds that all the countries except Japan prohibit resale and shared use. Japan has recently liberalized its resale and shared use policies. These policies are important, also, as they serve to restrict foreign (U.S.) market access to enhanced services and information services markets.

As the last three rows of Table 2 indicate, these enhanced and/or information service market segments are more open than basic telecommunication service markets. The openness is often open only or primarily to domestic industries. Foreign participation in these markets are often restricted through outright bars on foreign ownership; local participation requirements or through implicit barriers such as that imposed by restrictions on resale of international leased circuits, which happens to be a primary channel of distribution. That is, the international leased circuit may be the best (performance-wise) and most cost-competitive means of delivery of your service. Restrictions on circuit use, availability and interconnection translate into cost-performance penalties which, naturally, diminishes market competitiveness and can mean de facto market preemption. Also, emerging national information (or "informatics" or "telematics") policies--as opposed to telecommunication policies-generally speak to the issue of foreign participation. In this study, attention is called to Brazil who has developed and implemented the most comprehensive set of policies in this regard.

It is observed that most of the European countries distinguish quite vigorously (more so than in the U.S.) between the network and information content or programs. The province of the PTT monopoly extends only to the network. The private sector will be relied on to be the information or data base providers. Consequently, PTT competition is not an issue. However, this doesn't insure that foreign firms will be able to readily provide these services. As these services, often associated with new videotex services, are just beginning to emerge, it is not clear as to what the national policies will be. Once again, this will be determined more by information policies rather than telecom policies. The PTT will not be the main policy maker in these instances. Although not completely clear at this time, the indications are that local information industries will be relied on (and probably promoted, protected, etc.).

Equipment Market Structures and Policies

Foreign national interconnect or customer-premise equipment markets are characterized by three main market structures. The three models are not mutually exclusive. Indeed, all three are usually found to coexist in the same country. The three structures are government monopoly; government competition and regulated competition.

The prominent market structure mix is government (or carrier) monopoly for certain designated equipment and authorized competitive provisioning of designated and type-approved equipments. A variation of this arrangement is one wherein government competes with authorized competitors for certain equipments. Thus, the general situation is one in which some equipment is provided only by the PTT; some may be provided either by the PTT or authorized suppliers; and some are provided competitively by authorized manufacturers.

A review of Table 3 indicates that practically all of the subject countries have both monopoly and regulated competition structures present in their national interconnect markets. The monopoly structure may range from a 'primary instrument' policy to primary instruments plus data circuit terminating equipment (DCE) to the preceding plus terminals (DTE) to a complete monopoly on all equipment. The reach of the monopoly varies by nation.

TABLE 3

EQUIPMENT MARKET STRUCTURES AND APPROVAL AUTHORITIES BY COUNTRY

	EQUIPMENT	STANDARDS AUTHORITY			STANDARDS APPROVAL		
	Market Market Structure	Carrier (PTT)	Ind. Gov't.	Ind. Non-Gov't.		Further Liberalization Anticipated	Competitive Access Environment Anticipated
AUSTRALIA	M/RC	X		Future Plan	PTT	Possible but doubtful	Possibly More
AUSTRIA	M/RC			X	PTT	No	Status Quo
BELGIUM	M/RC	X			PTT	Possible	Possibly More
BRAZIL	M	X			PTT	No	Less
CANADA	M/RC		X		Ind-Govt	Yes	More
FRANCE	M/RC	X			Public Labs/PTT	No	Status Quo to Less
F.R.GERMANY	M/RC	X			PTT	No	Status Quo
HONG KONG	RM/RC				Monopoly Carrier	No	Status Quo
ITALY	M/RC	X			PTT	No	Status Quo or Less
JAPAN	GC/RC	X			PTT	Yes	More
MEXICO	M/RC	X			PTT	No	Less in Long Term
PHILIPPINES	RC		X			No	Status Quo to Less
SINGAPORE	RC	X			PTT	Possible	Status Quo
SWEDEN	M/RC	X			PTT	Yes	More
SWITZERLAND	M/RC	X			PTT	Possible	Possibly More
UNITED KINGDOM	M/RC	Interim		Future	BT-Interim Ind. Body Future	Yes	More in Long Term
VENEZUELA	M	X			PTT	Unknown	Unknown

CODE

GM = Government Monopoly - Government Ministry or Department.
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The most liberalized situation to be found in foreign equipment interconnect markets is that of 'regulated competition'. Since there is no case where government sanctioning is absent or even minimal--to the contrary, rather exhaustive certification is the norm--one does not find the 'liberalized entry' market model present in the equipment market segment of any of these countries.

Another dominant characteristic of interest shown on the table is the vesting of both standards authority and approval authority with the PTT organization. Standard-setting authority is vested in an independent non-government entity in Austria and possibly in Australia and is the intention in the United Kingdom.

Overall Finding

In summary, the global competitive environment for telecommunication and information services and equipment will be characterized by "selective competitive entry" limited to certain service or equipment categories and "administered competition" policies managed through official government authorization and licensing authority and standards-approval procedures. In general, despite encouraging instances, there does not seem to be appreciable international movement toward a truly competitive environment in telecommunication and information markets. One should be mindful that partial liberalization and limited entry is not synonymous with deregulation and reliance on market forces in lieu of government control. However, we appreciate that, insofar as 'regulated competition' produces more openness than conventional 'government monopoly', this is an overall positive development. This does not, however, necessarily insure expanded U.S. market access as the main benefactors of regulated competition are likely to be foreign national industries. U.S. firms may well find ways to participate in these 'windows of opportunity' but it will likely be in the form of joint ventures rather than outright exports.

AUSTRALIA

Organizational Structure

Australia is a federation of six States. There are also a number of territories. Powers are defined for the Commonwealth, and the States have the residual powers.

The Constitution vests power with respect to "postal, telegraphic, telephonic and other like services" in the national Parliament, which holds ultimate control over telecommunications, both within Australia and between Australia and other countries. Within this framework, the broad responsibility for telecommunications policy devolves on the Minister for Communications.

Within the Communications Ministry are two independent statutory authorities concerned with the provision of domestic and international telecommunications services (the Australian Telecommunications Commission or Telecom and the Overseas Telecommunications Commission (Australia) or OTC(A) and two statutory authorities concerned with broadcasting services (the Australian Broadcasting Tribunal and the Special Broadcasting Service). The Department of Communications is a small policy-oriented department whose main function is to advise and assist the Minister for Communications in the discharge of his responsibilities, including those relating to telecommunications.

The responsibility for telecommunications policy lies with the Minister for Communications. As the relevent Federal public agency providing policy advice for the Minister, the Department of Communications has a primary responsibility for overall national policy-making.* Nevertheless, a significant contribution to policy-making is provided by the statutory authorities, Telecom and OTC(A). Their legislation in effect is the established policy. Also, all matters associated with operations and service delivery are the responsibility of the service providers (Telecom and OTC(A).

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*In addition to its policy-making role, the Department of Communications has responsibility for broadcasting aspects of communications, for radio frequency management and for the establishment and implementation of satellite communications in Australia.

The Telecommunications Act 1975

The Telecommunications Act 1975 requires Telecom Australia, among other things, to

- plan, establish, maintain and operate telecommunications services in Australia;
- in so doing, to meet the social, industrial and commercial needs of the Australian people, and to make its services available throughout Australia for all people who reasonably require them;
- to have regard to the special needs of people who reside or carry on business outside the cities;
- to have regard to the desirability of improving and extending telecommunications services in the light of developments in the field of communications.

Services Structure and Policies

Domestic telecommunications services (telephone, telex, telegram, etc.) are provided by the Australian Telecommunications Commission (Telecom). International services are provided by the Overseas Telecommunications Commission (Australia) (OTC(A)). Both Commissions are independent statutory authorities established under separate Acts of the Parliament of the Commonwealth of Australia. Access to the national telephone network is available only through Telecom Australia facilities.

Domestic Services Structure and Policies

The principal function of Telecom as enunciated by the Telecommunications Act 1975, is "to plan, establish, maintain and operate telecommunications services within Australia." Telecom is required to perform its functions "in such a manner as will best meet the social, industrial and commercial needs of the Australian people for telecommunications services and to make its services available throughout Australia as far as is reasonably practical." In addition, there is a requirement for Telecom to have regard to the "special needs for telecommunications services of Australian people who reside or carry on business outside the cities." This latter requirement poses special difficulties, given Australia's size and population distribution with very low densities over most of the continent. Service is heavily concentrated in urban areas where over 10 million of Australia's total population of 14.6 million reside (almost 6 million of these live in either Sydney or Melbourne). Indeed, except along major intercity trunks and in the provinces of Victoria and New South Wales, rural services are inadequate.

That notwithstanding, service has now reached over 80% of Australian residences, with almost 8 million telephones in service in 1981. As of June 30, 1981, the number of telephone instruments in operation amounted to 51.8 per 100 population. As the common carrier, Telecom currently enjoys wide monopoly powers under its legislation. It has a monopoly over the provision of domestic telecommunications services and has exclusive power of authorizing equipment to be attached to the network. Telecom is exempt from all taxes, but there is a statutory requirement for Telecom to raise sufficient revenue to cover its operating costs each year and provide at least half of its capital requirements. Currently Telecom raises approximately 80% of its capital from revenue. The rest is borrowed. Government controls over the size of the capital program and borrowing levels contribute to this situation.

Under the legislation, charges for tariffs for basic services must be approved by the Minister for Communications. All other tariffs are fixed by Telecom itself. Local telephone traffic has been growing at about 4 to 5% annually and trunk traffic at about 15%. New service demand is also increasing, particularly in high growth areas, to the extent that Telecom Australia has had to take special measures to keep the backlog in connections under control.

The telephone network is also used:

- as a bearer for data services either over leased lines or the automatic telephone network. Modems are currently supplied by Telecom Australia with speeds up to 4800 bits/sec available on the switched network and much higher speeds on leased bandwidth.
- as a bearer for other services such as facsimile.
- to provide"enhanced"services such as Automatic Mobile Telephone Service, INWATS long distance calls to a subscriber at a local call fee with the called party meeting the balance of the cost) amd radio paging services.

TELEX Service

The national telex network, provided by Telecom currently has approximately 34,000 subscribers throughout Australia. International access to and from Australian telex customers is provided by OTC(A).

Annual customer growth has been approximately 15% over the period 1971-81 and traffic growth is currently 6-7% per annum.

The network consists of 7 crossbar trunk and associated subscriber exchanges in the major mainland capital cities with 12 major provincial towns having remote concentrator exchanges. The switching consists of L M Ericsson designed ARM crossbar exchanges and ARB crossbar concentrators. Stored program control (SPC) AXB exchanges using digital switching are planned for installation in major cities between 1982 and 1984.

Access to the telex network is available only through Telecom facilities and teleprinters are only available from Telecom.

Data Services

In recent years, growth in data transmission requirements in Australia has been of the order of 40% per annum and the average rate of growth forecast for the 1980's exceeds 25% per annum.

Telecom provides a number of public data transmission services as well as private leased lines. Telecom Australia's Datel service offers up to 48 kbits/sec on a private line and up to 4800 bits/sec on the public switched telephone network. At the end of 1982, Telecom introduced two new data services:

AUSTPAC - a public packet switching service

DDS (Digital Data Service) - a leased line service which will gradually replace Datel as the main leased line data service at speeds from 2400 bits/sec to 48 kbits/sec.

Data transmission can be via:

- switched telephone network
- privately leased telephone lines (up to 4800 bits/sec)
- privately leased wideband data lines (48 kbits/sec service)
- privately leased telegraph lines (slow speed data transfer)
- part-time privately leased lines (Datel or Telegraph)

Charges for the provision of data transmission facilities fall into three categories:

- connection charge
- rental charge (i.e. for modems and any leased circuits plus costs of maintenance)
- usage charge (i.e. where connected to the switched network)

Tariff trends are towards more distance independence reflecting the fact that trunk costs are becoming a relatively small proportion of the cost of providing the service. This is especially so for the new services AUSTPAC and DDS the latter of which will offer long distance inter-capital tariffs 30-50% less than Datel.

Domestic Leased Circuits

Private circuits may be leased from Telecom on a full-time, part-time and itinerant basis for the transmission of customer:

- voice
- data
- telegraph
- video and
- other wideband traffic

including television relay and braodcasting transmission facilities.

Lead times for leased circuits depend on the type of circuit and the route involved. They extend to 7 years for a new route, to 3 years for a new bearer on an existing route, and to 6 months for provision of a circuit from an existing bearer. In practice, the average waiting time for most customers is substantially less.

Interconnection to Public Networks

Private domestic networks may be interconnected to the public network, on payment of a surcharge, but must not be used for the purpose of switching third party traffic from and to the public network (i.e., they must not usurp the role of Telecom as the common carrier). Special exemptions have been made in the case of remote mining operations and certain public utilities.

Resale and Shared Use

Shared use of domestic leased circuits is not permitted, nor is resale sub-leasing of leased circuits. However, Telecom has permitted resale of data communications facilities within common interest groups such as SWIFT and SITA and with the scientific community (CSIRONET).

The formal legal basis for the regulation by Telecom of domestic private leased circuits and the connection of equipment to the switched network lies in its enabling legislation, the Telecommunications Act 1975.

If shared use and/or resale of domestic private leased circuits were to be permitted, there would initially need to be legal recognition of rights of access to the public network by carriers other than Telecom. Absence of such right would mean that Telecom, under its monopoly powers, could refuse, as it has consistently done in the past, to permit other carriers the unrestricted use of the public network to provide value added services. Thus if unqualified rights in respect to shared use and/or resale of private leased circuits are to be available to service providers, then the laws granting Telecom a monopoly of the public network would have to be amended.

International Services Structure and Policy

The Overseas Telecommunications Commission (Australia) is responsible for the establishment, maintenance, operation and development of all public telecommunications services between Australia and other countries, Australia and its external territories and with ships at sea. The Commission is wholly owned by the Australian Government through monies appropriated by Parliament which, together with retained profits, currently form the capital of the Commission.

OTC(A) has an effective monopoly on international telecommunications, although this is not provided by its legislation. The Commission is required by legislation to pursue a policy directed towards raising sufficient revenue to cover costs and to permit payment to the Commonwealth of a reasonable (as determined by the Minister) return on capital. Tariff levels and changes (OTC(A) relies upon Telecom, as the national network provider, to establish the connection between the subscriber and the 'gateway exchanges' to the international network provided by OTC(A). In effect, Telecom decides much of Australia's international services policies through its determination of conditions of access, use and interconnection.

International Services/Networks

International Telephone

OTC(A) provides international gateway and transmission facilities which enable the Australian national telephone network, provided by Telecom, to be interconnected with the international telephone network. The international telephone network is designed primarily for voice conversation use but is also used for:

- switched data calls;
- facsimile calls.

International Telex

OTC(A)provides international gateway and transmission facilities which enable the Australian telex network (provided by Telecom) to be interconnected with the international telex network.

All telex machines connected to the national network have the ability to both send and receive international telex calls.

Access to the international telex network can be obtained via:

the national telex network;

telex tie-lines which directly connect a subscriber's telex machine to the OTC international telex gateway exchange. Such tie-lines are leased, by the subscriber, from the national carrier, Telecom.

International Data Services

OTC(A) provides customers with two data services, MIDAS and Overseas Datel:

1. MIDAS is an electronic international public data communications service for interactive data transfer such as bibliographic searches and database information retrieval. The service offers access to international databases, timeshare and electronic mailbox services and uses packet-switched technology.

Users must apply to OTC(A) for a MIDAS password to enable access to this service.

Access by data terminals to the MIDAS gateway is through:

the national public switched telephone network; or

tie-lines leased from the gateway to the customer's premises. Tie-lines are leased by the subscriber, from Telecom.

2. Overseas Datel is an electronic international public data communications service for on-demand transfer of large volumes of data. The service uses circuit-switched technology and enables interconnection with the international datel network.

Access to Datel is only through OTC operator (service not at present automated).

Access by data terminals to the Overseas Datel gateway is through:

the national public switched network; or

tie lines leased from the gateway to the customer's premises. Tie-lines are leased, by the subscriber, from Telecom.

International Leased Circuits

OTC(A) provides Australian customers with an extensive range of leased circuits including Telegraph, fixed bit rate, multi-purpose voice/data and high-speed data circuits.

Interconnection to Public Networks

OTC(A) observes the provisions of the D Series Recommendations of the CCITT. Therefore, OTC(A) regards interconnection of international leased circuits to the public data network as acceptable in bona-fide inter-company, affiliate or associate relationships and not where the company's proposed use of the leased circuit could tend to put it in the position of venturing into a quasi-telecommunications carrier role. Similarly, where a leased circuit service is used by a lessee in conjunction with a data processing service, OTC(A) generally applies policies designed to ensure that operation of the service is restricted to the lessee or its affiliates, etc. and to ensure that the data processing operation is not extended into a quasi-telecommunications carrier venture.

Resale and Shared Use

Shared use and resale of international leased circuits is not permitted. The use of international leased circuits for providing value added services is only permitted for organizations formed to meet the specialized international communication needs of their members like SWIFT and SITA.

Generally, leased circuit facilities are to be used for the reception and transmission of communications relating to the business of the lessee only and the transmission or reception of messages for third parties is expressly prohibited.

Closed user groups are permitted to lease circuits in general accord with the provisions of CCITT Recommendation D.6.

New Services

In 1975 Telecom produced a major blueprint for upgrading the Australian network (Telecom 2000 -- An exploration of the Long Term Development of Telecommunications in Australia). This report called for major service innovations, including substantial digital conversion of the local and long haul telecommunications network. Many of these improvements have not yet taken place. However, some are finally coming to fruition. Three major new services in text, image and data communications are planned for Australia: packet switching, digital data services and videotex.

Telecom initiated the first two services in two new data networks introduced in December 1982. The public packet switching service, AUSTPAC, will be targeted primarily at emerging applications such as electronic mail and electronic funds transfer. The inter-capital Digital Data Service will offer improved service and lower costs than Telecom's present Datel service.

Videotex technology has attracted interest from the private sector in Australia, and the Government's view is that videotex services should be under private sector ownership and control. It is acknowledged that there is a need to use the Telecom network. The possibility that Telecom could provide 'gateway' services is also acknowledged. A review of policy on videotex services will be made in the context of the report of the telecommunications services inquiry.

Also of interest is the establishment of a separate company, AUSSAT Pty Ltd, to own and operate Australia's national satellite system, which is planned to be operational in 1985. AUSSAT is currently a totally Government owned company, but the Australian Government has announced its intention to convert AUSSAT to a public listed company with 49% of AUSSAT's shares to be offered to the private sector in time.

AUSSAT will provide service to five earth stations located near Australia's five major cities. It is possible that other users will be allowed to connect to the system from their own earth stations.

The AUSSAT service, which will use satellites and earth stations in Sydney, Melbourne, Canberra, Darwin and Adelaide, could make great innovative strides in Australian telecommunications. While initially AUSSAT will be a carrier's carrier connecting Telecom local exchanges it is quite possible -- even likely -- that it will develop into something more. Already under consideration is a plan to allow downlink traffic to portable or fixed private earth stations. Further, liberalization may allow private satellite networks using the AUSSAT satellite and customer premises earth stations. These may even come about by 1990. More problematic is the interconnection of these private networks with the public switched network.

Equipment and Interconnection Policy

The Telecommunications Act provides that Telecom may authorize the attachment of a line, equipment or apparatus to its network. In providing such authorization, Telecom may specify the terms and conditions to apply. Telecom's present policy is that, subject to meeting technical specifications, it will consider authorization for the supply and connection of equipment to its network provided it is a product or service which provides a facility not available from or intended to be provided by Telecom.

Consequently, there are restrictions on the equipment that may be connected to the public network. There are type-approval requirements for a "permit to connect" equipment to public networks or leased circuits. The policy practice varies somewhat by the particular network service.

Telephone Network

Telecom will authorize connection of private equipment to the telephone network where the equipment complies with minimum safety and network performance specifications, does not significantly compromise Telecom in the performance of its functions and is a product or facility not available from or intended to be provided by Telecom. Since 1975, approximately 3300 permits have been issued for connection of voice band products of all types.

The number of PABX suppliers and the number of new PABX systems is restricted. This is intended to provide customers with a maximum level of choice consistent with the limited ability of the Australian market to support a large number of suppliers and Australian Government policy encouraging Australian manufacture. Telecom has retained the exclusive right to supply PABXs to Australian Government Departments. It competes with the private sector in some of the other areas. With a few exceptions, Telecom Australia maintains all PABX systems including those privately supplied and installed.

Generally, private data terminal equipment must be connected to the network through modems supplied and maintained by Telecom.

Telex Network

Only the standard Telecom supplied machine is permitted to be connected to the network. Teleprinter terminals, currently Siemens M100 Series 1 and 2 and Sagem TX20, are supplied by Telecom for rental or purchase.

Telecom permits connection of privately owned terminal equipment such as computers and communicating word processors that meet connection standards. In such cases, customers are required to rent a standard telex machine as a back-up in the event of failure of the privately supplied equipment. Permits for connection of private wire terminals or switching equipment are issued where the customers' needs cannot be met by equipment available through Telecom.

Data Services

Telecom provides, installs and maintains its data services. Generally, data terminal equipment must be connected to the network through modems supplied by Telecom. Only private data terminal equipment which has been granted a "permit to connect" may be connected to the network.

Until early 1980, policy was that all modems be provided by Telecom except where it was unable to provide a suitable modem to meet a specific requirement. This is being relaxed with the gradual introduction of an Analogue Data Service which will allow privately provided stand-alone and integral modems to be attached to the network.

Acoustic couplers may be privately supplied after receiving a "permit to connect" and used for the transmission of data up to speeds of 1200 bit/sec over the switched telephone network.

Leased Circuits

Generally, terminal equipment may only be connected to domestic circuits through modems supplied and maintained by Telecom. Terminal equipment also needs to be approved by Telecom before it can be connected to a leased circuit.

Equipment Connection to International Services/Networks

Telecom, as the national carrier, determines the conditions for connection of equipment to the telephone network including the connection of data modems and facsimile terminals.

Conditions relating to the connection of equipment are determined by Telecom. One such condition is that any telex machine connected to the network must be obtained from Telecom.

Conditions relating to the connection of equipment to the MIDAS and Overseas Datel networks are determined by Telecom.

To access the international portion of leased circuits provided by OTC(A), the customer must first access the national extension (tail) provided by Telecom. Conditions relating to the connection of terminal equipment to the network are determined by Telecom.

Type Approval

Equipment that is granted a "permit to connect" must be type-approved, which requires that technical standards be met. Presently, these standards are set by the public carrier, Telecom. However, the Government announced in April 1981 that the determination of standards of equipment for the interconnect market would be transferred to an independent body. The Davidson report recommended that the Standards Association of Australia perform this task. [See Prospective Changes].

Before type-approval is granted, tests must be carried out on the equipment by an approved laboratory to ensure its compliance with all clauses of the relevant specifications. The submission shall include:

detailed results of all such tests;

test methods and instruments employed;

names of the laboratory and personnel coneucting tests.

The charge for testing compatibility of privately supplied equipment with the public switched network is AA360*. If modifications are required, a further $A57.00 is applicable.

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*$342.00 at current (March 1983) exchange rates.

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Telecom and OTC(A) Procurement

Telecom has no manufacturing capabilities and thus it purchases equipment from many suppliers. However, because of high tariffs and non-tariff restrictions, there exists preference for equipment manufactured in Australia.

Both Telecom and OTC(A) adopt the public tender approach to procurement. Tenders are publicly advertised in Australia and where appropriate overseas. Tenders are evaluated within the respective organizations.

There has been a major change recently to the Government's policy relating to preference for Australian goods. The previous policy related to all goods, with a 20% preference being given to those with the highest Australian content (provided they were technically suitable).

The major change to this policy is that now preference will only be given to defense strategic or high technology goods. At this stage, neither defense nor high technology are defined. Hence, a case by case basis applies.

The Australian Government has a longstanding policy of preference for Australian goods in purchases by public bodies. In addition Telecom has always been concerned to ensure future supplies of equipment by promoting and fostering domestic production. Telecom is the largest purchaser of telecommunications equipment in Australia, absorbing about 90% of local production of telephone equipment and providing three-quarters of the total market according to a 1976 report on telecommunications equipment by the Industries Assistance Commission. Its policy of obtaining Australian equipment when practicable thus serves as a de facto restriction on the amount of telecommunications equipment from foreign sources in the Australian market.

However, private equipment suppliers are not bound by any "buy Australian" policy and are thus free to sell any foreign-originated equipment, although it is subject to a 30% import tariff and must be approved for attachment to the network.

Foreign Entities and Ownership

Public telecommunications services in Australia are provided by Telecom and OTC(A). Foreign entities as such are not specifically excluded, although the monopoly position of each of the service providers acts as an exclusion.

Information Processing/Services Policies

There currently exist restrictions on data processing/information service providers. Time sharing and other like computer services or networks are not permitted to operate over the public networks in such a way that discrete through connections are provided (message switching) between two or more organizations, when these organizations are not owned by the lessee of the service or network.

Similarly, as seen earlier, where an international leased circuit service is used by a lessee in conjunction with a data processing service, OTC(A) generally applies policies designed to ensure that operation of the service is restricted to the lessee or its affiliates. OTC's policy regarding the interconnection of international leased circuits to the public network emphasises observing the provisions of the D Series Recommendations of the CCITT, especially CCITT Recommendation D.1.

OTC regards public network interconnection as being acceptable in bona-fide inter-company, affiliate or associate relationships but not where the proposed use of the leased circuit would be an infringement on the common carrier functions of OTC in providing telecommunications services to others. For example, where an international leased circuit is used by a lessee in conjunction with a data processing service, OTC applies policies which are designed to ensure that the data processing operation is not extended into a quasi telecommunications carrier venture. The transmission or reception of messages for third parties is expressly prohibited.

There does not appear to be a need to alter the basic legal structure regulating provision of international telecommunications in order to enable the shared use or resale of leased private international circuits. In practice, however, since the international service interconnects with the domestic public network, the shared use or resale of private international circuits could not eventuate unless domestic laws were amended to recognize the unqualified rights of service providers to use the public network to provide end user services.

Prospective Changes

An independent public committee of inquiry into telecommunications services has very recently released its report.* The committee was required under its terms of reference to examine the extent to which private sector involvement in the provision of existing or proposed telecommunications services could be widened in competition.

[illegible] 1982.

The inquiry also was to examine the statutory functions, duties, financial objectives and monopoly provisions of the Australian Telecommunications Commission and the possible need for any revised regulatory arrangements in the telecommunications field. This inquiry, which has now become widely known as the Davidson Inquiry and the Davidson Report has recommended far-reaching changes in Australian Telecommunications. However, it should be noted that there is mounting opposition to the substantive recommendations of this report. Also, the return of a Labor government would most likely diminish or suspend its impact.

Key Recommendations of the Davidson Report

Structural Recommendations

1. The Australian Telecommunications Commission should be abolished and replaced by an incorporated company. "Telecom Australia Limited" owned 100 percent by the Commonwealth Government.

2. Telecom Australia, Ltd. may enter joint venture or partnerships as well as form or participate in the formation of subsidiary companies which have as object the operation of telecommunications systems.

3. The Commonwealth's relationship with the company should be one of shareholder to company.

4. Statutory powers of ministerial direction should not extend to the company's telecommunications prices, company management or staffing, purchasing policies or contracts for goods and services.

5. Telecom's staff and assets associated with the marketing of terminal equipment should be transferred to a separate organization ('Telequip'); wiring in customers' premises should be reorganized in such a way as to permit effective private sector participation in that field.

6. The Telecommunications Act 1975 and Wireless Telegraphy Act 1905 be replaced by a new telecommunications act.

7. A national telecommunications advisory council be established.

8. Unrestricted use and resale of leased telecom capacity should be permitted.

9. Operation and use of networks based on leased telecom capacity should not be subject to licensing or other form of authorization or regulation.

10. Indpendent networks should be permitted subject to ministerial authorization and there should be no restriction on the class of traffic carried.

11. Independent networks engaging in common carrier activities should be subject to an endorsement to that effect as a condition of authorization.

12. Telecom should be permitted to compete on an equitable basis with independent network operators engaged in common carrier activities.

13. AUSSAT should not be permitted to own but should be permitted to operate leased terrestrial networks.

14. Telecom networks and independent networks shall conform to approved technical standards.

15. For cable networks (including CTV) telecom should own and be responsible for maintenance of all cable and equipment in telecom ducts.

16. Interconnection should be permitted between leased telecom networks and national terrestrial public switched networks, subject to:

A. Compliance with appropriate technical standards

B. Payment of a time-based local call fee at each point of interconnection and any other appropriate facility charges.

17. Interconnection should be permitted between independent networks and the national terrestrial public switched network on the same basis as leased networks with the added provisions that:

A. Ministerial authorization has been given for interconnection.

B. The interconnection agreement is available on public record.

18. Network or system providers, including telecom, should not provide information or entertainment services unless the services are network-based or the services relate to the conduct of their business.

19. Telecom should be permitted to offer public leased network capacity and 'gateway' facilities to information and 'videographic' service providers a non exclusive and commercial basis.

20. Current telecom practice of supplying public access telephones should continue. However, local councils, Australia Post or Community organizations should be free to provide public telephone services.

21. Leased coin operated telephones ('redphones' and others) should be regarded as part of the open terminal equipment market.

22. Australia Post should assume the role of principal rather than agent in the management of the public telegram service with the telegraph network (TRESS) provided by telecom on a leased capacity basis.

23. Telecom's pricing policy should:

A. Reflect costs to a substantial degree;

B. Minimize price discrimination;

C. Adopt timed local calls.

24. Cross subsidization should be reduced to levels which Telecom can absorb yet remain competitive.

25. Direct subsidy funded from sources external to telecom should be introduced for any class of subscriber which government wishes to assist.

26. The private sector should be permitted to participate in all aspects of terminal equipment marketing and wiring in customers' premises.

27. Responsibility for technical standards for terminal equipment should be transferred from telecom to an independent standards authority and that the Standards Association of Australia (SAA) be so designated.

28. Telecom's network interface should be at a junction box at the boundary of the customer's property or on the outside of the building as appropriate.

29. A standard plug and socket should be required at the terminal installation point within customer premises where appropriate.

30. Liberalization of the terminal equipment market should not occur until:

A. 'Interim' standards are published by the standards authority.

B. The Technician Licensing Board has commenced operations;

C. Telecom staff, assets and liabilities have been transferred to Telecom Australia Limited or the proposed independent telecommunications equipment company.

D. Telecom writes off internal household wiring and offers subscribers the option of purchase or rental of existing telephone handsets;

E. Standards are available for standard terminating plug and socket configurations at terminal installation point and for a standard terminating junction box for a network interface external to subscriber premises.

Government Procurement and Preference for Australian Manufacturing Industry

31. The government's preference and offsets policies should apply to telecom only to the same extent as they apply to the private sector.

32. Ministerial approval should not be required for any telecom contracts.

33. Telecom should not be required to use the services of the Department of Administrative Services.

34. Telecom should support the local manufacturing industry only when it is telecom's commercial interest or when a general government policy for industry applies.

Broadcasting and Cable Review

A second major review which could have policy implications in the telecommunications field is a public inquiry into cable and subscription television services, conducted by the Australian Broadcasting Tribunal. The resulting report, which was released in August 1982, recommended that cable television should be introduced in Australia as soon as practicable, that the separation of ownership of the cable reticulation system and the operation of cable television should be permissable, that private sector and public sector authorities (including Telecom) should have equal opportunities to own and maintain the cable reticulation system, that cable television systems should be permitted to carry enhanced services, and that a single federal regulatory authority be established with responsibility for both broadcasting and telecommunications. These recommendations are being considered by the Australian Government.

Future Competitive Access

The assessment of future competitive access in Australia is especially difficult. On the one hand, there are positive signs of the Australian domestic* market opening up. Those signs are visible in the report of the Davidson Inquiry and in such new endeavors as the AUSSAT satellite system. However, the impetus of the Davidson report may well be blunted by other traditional, dominant forces present in the Australian situation, particularly restrictive trade and investment policies. Too, restrictive equipment policies and preferential treatment policies are widely supported in Australia, particularly by trade unions which represent a majority of the Australian work force and are a powerful political force.

Many industries are protected by high tariffs, by non-tariff barriers and in some cases, by domestic content requirements. The Australian government feels that this has been necessary in order to ensure that some degree of domestic manufacturing exists and that domestic services will not be dominated by external suppliers whether they come from the U.S. or Japan.

Australia's trade policies have, historically, been restrictive, designed to protect indigenous Australian manufacturing and service industries from foreign competition. This restrictive trade approach still has quite strong support from the majority of the population. This attitude will likely be applied to or continued for high-technology industries as they emerge in Australia. Hence, even if the government allows more open interconnection of terminal equipment it is unlikely that equipment not manufactured in Australia will be competitive. Foreign firms will likely find joint ventures necessary to access the market.

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*The proposed [Davidson] structural changes do not appear to address the monopoly on international service.

Moreover, under the keen eye of the Foreign Investment Review Board, the Australian government monitors and approves the extent of foreign ownership in certain industries. To date this has centered on the natural resources industry but has also affected high-technology industries. The thrust of this policy is to restrict the share of foreign ownership of Australian natural and industrial resources. Such a policy could impact entry of U.S. firms into the Australian telecommunication and information markets as many nations consider these areas strategic industries.

In the interests of fairness, the government has asked the Industries Assistance Commission--the Australian protection review body--to report on ways of reducing protection throughout industry. Nonetheless, a radical reform to the structure of protection is not likely.

The introduction of satellite services in 1985 may provide some liberalization of domestic long haul telecommunications, at least to the extent of allowing private satellite networks. However, the prospects of competitive telecommunication services is primarily dependent upon the extent to which the far-reaching structural recommendations of the Davidson Report are embraced by Australians, Australian telecommunication authorities and the Australian government.

Since its publication in October 1982, the Australian government had received more than 1500 submissions commenting on the Davidson report by its January 31, 1983 deadline. As the foregoing analysis would suggest, unions, employer groups and farm groups have attacked, negatively, key recommendations of the report. The opposing groups include the National Farmers' Federation and a coalition between the Victorian Government, major employer groups and trade unions. A new labor government cannot be reasonably expected to embrace the main thrusts of the Davidson recommendations.

Australia Telecom is laying low with its own low-key, "positive" response to the report. Notwithstanding, it, too, has problems with key structural components of the report. Consequently, left to its own determination, one can't reasonably expect Telecom to implement these structural reforms.

U.S. Effects

The overall effect of this pattern is the general exclusion of U.S. manufacturers and service providers from the Australian marketplace.* Any competition which does take place will be in long-haul digital communications via satellite and in terminal equipment. Both markets via trade policies and investment policies will be reserved for Australian firms (which may, of course, include Australian controlled subsidiaries of U.S. firms). International information service access will continue to face restrictions.

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*The term 'general exclusion' is highlighted here since there will probably be isolated pockets of market opportunity for certain firms.

AUSTRIA

Organization Structure

Austrian Law grants the postal authorities a monopoly in the communications field. Responsibility for telecommunication services in Austria lies with the Post- und Telegraphenverwaltung, or simply, the Austrian PTT. The exclusive right of the ministry to provide and operate telecommunications facilities within Austria is laid down in the Telecommunications Law (Fermeldegesetz) of July 13, 1949.

Therefore, all telecommunications facilities are provided and maintained under the authority of the Austrian PTT. Responsibility for telecommunications policy-making is shared between the Austrian PTT and the Austrian Parliament. The Austrian PTT is responsible for outlining policies and drawing up regulations but it is up to the Austrian national assembly (Parliament) to formulate the policies and regulations and pass them in the form of laws. This applies for all regulations concerning telecommunication without exception. These laws range from controlling access and use of networks and private circuits (Fernmeldegesetz, Fernsprechordnung) to laws that lay down the rates in all details (Fernmeldegebührenordnung).

In executing these laws the PTT has a monopoly. However, by offering network services the PTT has to comply with the standards set by the Austrian Standards Institute, in accordance with international recommendations.

The structure and policy control of the PTT is administered by a General Directorate. The General Directorate operates through five local directorates (Post-und Telegraphendirektionen). For telecommunications the Central Telecommunications Engineering Establishment. (Fernmeldetechnisches Zentralamt, FZA), also has an important role. It is responsible for technical specifications, the approval of private equipment for use on public networks and for research. Its role is similar to that of the FTZ in Germany, except that some of the tasks that would be undertaken by the FTZ are in Austria delegated to the local directorates.

Radio Austria AG, initially a private company set up in 1922 and now owned by the government since 1955, supplies intercontinental telex and international telegram services, intercontinental private telegraph circuits, and since 1978 has provided access to the US data networks "Tymnet" and "Telenet". The company has also been involved with the PTT in the introduction of international facsimile, teletex and message switching services.

Responsibility for telex transmission is divided between the PTT and Radio Austria AG. The PTV deals with services inland and to 26 European countries, while links to a further 157 countries are made over the connections of Radio Austria.

There is no overall plan for the long term development of telecommunications services in Austria. As a small country, Austria has limited capabilities to take the lead in developing new services. However, the Government of the Republic of Austria represented by the PTT makes every effort to satisfy all user requirements by providing a large variety of telecommunications services with the latest technology.

There are several initiatives taken by the Austrian Government to examine developments in the telecommunications field. These include the cooperation of the PTT with the Technical University of Graz on videotex and with the Technical University of Vienna on packet switching technology.

Service Policies

Telecommunications services offered by the Austrian PTT include:

1. Public telephone network,
2. Private circuits,
3. Public telex network,
4. Public data networks
    - Circuit switched, Datex
    - Direct (fixed connections), DON
    - Packet switched, from 1982
5. Radio Paging,
6. Radio Telephone,
7. Videotex (Bildschirmtext),
8. Electronic Mail,
9. Facsimile (Telepost, Telefax).

Telephone Network

The traditional forms of telecommunications are telephone and telex services. The PTT not only provides the necessary network for these facilities but also runs maintenance services for the terminal equipment. In the case of the telephone system they also supply the telephone instruments as well as offering extension facilities.

Since 1972 Austria's telephone system has been fully automatic. For both telephone and telex subscribers direct connections within Austria and with other countries in Europe can be made by direct dialing. (In 1981 there were 2.3 million subscriber telephone connections.)

The telephone network is not well suited for data transmission and the PTT makes no guarantees. The telephone network has been used to offer new facsimile services. One such service offered by the PTT over the telephone network is the bureaufax service (Telepost). Telepost is presently restricted to copying between 72 post offices throughout Austria.

A telefax service via telephone lines is also available. Private users can connect their telefax equipment onto the telephone network. Telecopying machines of class 2 (~ 3 min/page) and class 3 (~ 1 min/page) can be used with this service. The PTT issues a directory of telefax subscribers in Austria. Interworking between bureaufax and telefax is also possible.

A new public telefax service for class 4 machines (less than 20 sec/page) is in preparation via the Datex-L nerwork.

The telephone service in Austria is operated by the PTT through the telecommunications group in Vienna and the local directorates. At the end of 1979 the country was divided into 992 local networks served by 1355 exchanges.

Telex Network

The main purpose of the Telex network is the provision of the national and international telex service with over 20,000 subscribers currently in Austria. There are only three types of telex equipment approved by the PTT that must be provided by the user himself. Presently they are:

ITT LO 2000

Siemens T1000

Olivetti TE 431

It is planned, though, that these be replaced by new equipment of the same three manufacturers. The PTT offers a maintenance service for these telex machines.

The rate structure is based on a monthly basic charge with a surcharge for certain special services such as serial number, direct call (without dialing) etc., and a duration charge according to four national zones.

The transmission speed in the telex network is universally 50 bit/s.

As noted earlier, telex connections to countries outside of Europe are not provided by the PTT, but by an independent, though also government-owned agency, the Radio Austria AG. The equipment, however, may be the same, the only difference for the user being separate billing for PTT-provided connections and those provided by Radio Austria.

The PTT's telex services are fully automatic; the 26 European countries covered include Czechoslovakia, Rumania, Poland and the USSR. The services to a further one hundred countries (including Canada, Japan, Israel and USA) are also fully automatic. Radio Austria uses a computer controlled switching system called ELTEX. The connection of two or more subscriber installations or connection to private circuits is allowed only under special circumstances.

Data Transmission

Data can be transmitted in several ways including the PSTN, the telex network (very slow speed), private leased circuits and public data network facilities. In the past, Data service over the PSTN has been constrained in Austria due to peculiar technical characteristics of the Austrian telephone network. This is gradually being improved but still remains a performance restriction. The main purpose of the telephone network is clearly voice communication on a national as well as on an international level. Data communication via the public telephone network is at the user's own risk. The PTT supplies no facilities for data communication - least of all data terminal equipment - and also provides no maintenance service. All they offer is assistance in electronic measurement and testing when the equipment is first operated and help in the event of line failure. No modems are provided for by the PTT and therefore have to be purchased by the user from modem manufacturers. Normal telephone rates with a 25% surcharge for data transmission are applied for this service.

The traditional telex network is severely speed-limited. The public networks on which data may be effectively transmitted in Austria are similar to those available in West Germany:

1. Public switched telephone network,
2. Combined telex and data (Datex) network (IFSD),
3. New packet switched network,
4. Direct data networks (DDL or DDP).

The Direct Data Networks provide for fixed connections and were aimed at subscribers exchanging large volumes of data with a single other user. The DDN was designed to attract leased circuit customers by its comparatively lower costs and error rates.

The Integrated Telex and Data Network (IFSD = Integrietes Fernschreib- und Datennetz)

In the autumn of 1982, new network services were introduced by the PTT. Together they are known as the Integrated Telex and Data Network (IFSD). The traditional telex network is now incorporated in the IFSD. The two major data networks in the IFSD are:

- the circuit switched data network,
- the packet switched data network.

Each of the data networks provides a dialing network service (Datex-L, Datex-P) and a direct link network service (DDL, DDP). Access to all these network services is available by subscription similar to the public telephone service.

Datex-L

The Datex-L network is circuit switched using Siemens EDS equipment, and is very similar to the German Datex-L service. An asynchronous, full duplex 300 bps service (Datex-300) was inaugurated in 1980, and synchronous transmission at speeds of 2400 bps, 4800 bps and 9600 bps.

Connection to the Datex network is made over a PTT owned "DFG 300" DCE. This offers an X.20 interface for privately owned terminating equipment, which must have valid FZA approval and be clearly marked with an official number.

The main purpose of the Datex-L network service is the provision of very secure (bit error rate $<1\times10^{-6}$) and completely transparent data communication between any two subscribers within

Austria. International communication exists on the asynchronous service with the Federal Republic of Germany and Switzerland. Other countries are in a negotiating phase.

The asynchronous network (Datex-L 300) operates according to CCITT X.20 or X.20 bis during the call establishment phase. The protocol during the data transfer phase is at the user's choice.

The synchronous network uses CCITT X.21 during the call establishment phase and is completely transparent during the data transfer phase. Special services may be requested such as direct call (no dialing), closed user groups and the like.

The public Teletex service operates via the Datex-L network with 2400 bit/s. Teletex is a complete service which comprises all layers of the ISO reference model defined in the CCITT teletex protocol. Therefore the PTT imposes strict regulations for the certification of Teletex terminal equipment but nevertheless it has to be provided by the user and cannot be rented from the PTT.

The PTT has also installed teletex/telex protocol converters in the switching centers so that messages (albeit with the limited number of characters required by telex, e.g. small letters) can be sent from a teletex terminal to any telex subscriber. The protocol converter performs the conversion of the character code, the baud-rate and the protocols. It is also designed to perform the reverse process from telex to teletex. The teletex/telex conversion is available for connections from Austria throughout Europe. Since August 1982 teletex/teletex connections are available between Austria and the Federal Republic of Germany.

The rates for all Datex-L network services are based on a monthly basic charge dependent on the transmission speed with a surcharge for additional services such as closed user groups and the like. The basic charge includes the rent for the DAG as well as maintenance of all aspects of the service. In addition, there is a duration charge in units of seconds in two regional zones, again depending on the transmission speed. A reduction of 33% from 6 p.m. to 8 a.m. exists as well. A small call set up charge (AS 0.30) is applied for each connection establishment.

DDL

The difference between Datex-L and DDL lies only in the fact that in DDL the connection between certain subscribers is established at the time of subscription and cannot be changed. Within Austria, point-to-point as well as multipoint connections are possible.

As for the rate structure, the duration charge is replaced by a fixed amount per month with no regard to the actual use of the connection but dependent on the distance in km on the asynchronous network (300 bit/s) and on the two regional zones on the synchronous network. Beginning in 1983 the same structure of regional zones will be applicable on the asynchronous network as well.

Datex-P

Datex-P is the public packet switched data network service according to CCITT recommendation X.25 with switched virtual circuits.

Three types of data terminal equipment (DTE) can be connected to Datex-P:

- synchronous packet-oriented DTE
- synchronous character-oriented DTE
- asynchronous character-oriented DTE.

The connection can be made either directly to a packet switching node or via a Datex-L center. It is not planned that telephone and telex subscribers will have this type of access.

Synchronous DTE can be connected with transmission rates of 2400 bits/s. For packet-oriented DTE, the speed of 48,000 bit/s is also available. Equipment must fulfill the requirements of the interface recommendation X.25 at all three levels (X.21, LAP B, X.25 lev. 3).

Asynchronous character-oriented DTE can be connected according to recommendation X.20 (X.20 bis) with 300 bit/s. The network provides a Packet Assembly/Disassembly Facility (PAD) according to CCITT X.3, X.28, X.29.

Synchronous character-oriented DTE with 2400-9600 bit/s have to fulfill recommendation X.21. A protocol adapter to transform the IBM 3270 procedure is available.

Datex-P went into operation at the same time as Datex-L with basically the same quality of service. Thus, the PTT offers the user the free choice of the network service that best meets his technical and economical requirements. This is also reflected in the rate structure: Whereas the monthly basic charge and the call set up charge are exactly the same as for Datex-L (apart from a small monthly surcharge per virtual circuit)), the charges for the actual usage of the service is based almost fully on the data volume (supplemented by a small fee based on the connection time). As in Datex-P, different rates apply for the two regional zones and a reduction of 33% between 6 p.m. and 8 a.m. is given. In general, dialog applications favour the use of the volume-oriented Datex-P, whereas bulk transfer applications would tend to favour the time-oriented Datex-L. Connection facilities on an international level are currently in preparation.

DDP

DDP differs from Datex-P only so far as the connections between two users are permanent virtual circuits. Dialing and connection establishment are therefore not necessary, because the connection is permanently available. This is reflected by the rates since the charge for the connection time is replaced by a fixed monthly rate.

Private Leased Circuits

Leased circuits are currently provided by the PTT by way of the transmission facilities of the telephone network. This means that a modem is necessary for the connection of terminal equipment to the leased circuits. The modems are not provided by the PTT, the user is responsible for obtaining and maintaining modems that meet the PTT requirements.

Permission for a private circuit will normally only be granted when the desired facility cannot be obtained on the public networks. Private telegraph, telephone and wideband circuits are available from the PTT through regional and local offices and the Generaldirektion in Vienna. The waiting period for all types of private circuits varies to a very large extent, depending on the technical circumstances of the respective areas. Waiting times have been particularly long for wideband circuits. In their application for a private network, customers must provide the PTT with the following information in accordance with CCITT Recommendation D 1:

- Configuration of the network (diagram);
- Addresses of end-points and name of owners;
- Diagram of terminal equipment (designation of data processing installation, type of terminal, multiplexing equipment, concentrators, etc.);
- Exact designation of data transmission equipment (make, type manufacturing number);
- Intended transmission speed (bps or baud);
- Operation (4-wire or 2-wire, simplex, duplex or half-duplex);
- Dates of any planned extensions of the installation;

Since the introduction of the new public data networks (PDN), the PTT encourages the use of the new services to take the place of leased circuits. Although it is still possible to lease private circuits the PTT is currently considering regulatory measures to prevent the establishment of new private networks. Within a reasonable period of time (e.g. 5 years) the PTT is aiming toward full conversion of all private leased circuits into the use of public data networks.

The rates for leased circuits are charged on a monthly basis and depend solely on the distance of the leased circuit. In comparison with DDL, these charges are generally lower than DDL in an area of less than 20 km, higher for larger distances.

The current rates already favour the use of public data networks (in particular of DDL) for distances over 20 km, for short connections in urban areas (especially in Vienna) the use of leased circuits is still more economical. However, the PTT hopes to attract new users for the public networks through better service (testing facilities within the DAGs, etc.) and a better bit error rate rather than through regulatory and pricing measures.

It is the clear policy of the PTT to restrict the use of private leased circuits at a pace at which they can reasonably be replaced by the public data network services of the IFSD. The PTT would prefer to achieve full conversion by means other than regulations prohibiting the use of leased circuits but such strict measures are not ruled out for the future.

Leased Circuit Interconnection

The connection of two or more private circuits as well as the connection of one or more circuits to the public network is possible only with a special license from the PTT. It is permitted only if the users are all part of the same company or its subsidiaries.

Permission to connect private circuits to the public networks can be granted only for circuits used for the transmission of data. The charge for telephone circuits with this facility is 50% in addition to the normal rental (corresponding to CCITT coefficient 1).

The connection of international private circuits to the public networks is permitted for telex or data applications, but not for telephone traffic. With the new emphasis on PDN services and discouragement of leased circuits, the PTT does not encourage the interconnection of leased circuits to the public networks. Occasional exceptions are made especially for the interconnection of international leased circuits to the telex and the telephone network (e.g. SWIFT banking network) and to the new data networks as well. Until full agreement about this problem is achieved within CEPT, these exceptions are handled on a bilateral basis between Austria and the countries involved.

Resale and Shared Use

The shared use of leased circuits is only possible for branches of the same legal entity (company, etc.). It is prohibited for a private user to act as a switching center for other users or to resell services by shared use of leased circuits.

New Services

Telefax

A telefax service via Datex-L 2400 is under preparation. It is planned to provide a combined teletex/telefax service that would allow signatures and drawings to be sent with a teletex document.

Videotex

A new videotex service (Bildschirmtex) started its testing phase in 1981. Videotex exploits the wide distribution of TV sets and the high density of the telephone network. Access can be granted to any telephone subscriber who has one of the PTT-approved TV sets (currently only certain models from Phillips and ITT) with a decoder. In the case of videotex, the PTT provides the modem for connection of the TV set to the telephone network and the necessary maintenance service.

An information provider can rent a number of videotex pages at the videotex center, the user can select any of the provided pages, possibly for a fee that has to be paid to the information provider.

A monthly fee of $U.S. 200has to be paid by the user of the service for rent and maintenance of the connection equipment including the modem. As a connection charge only the rates for local telephone calls are applied for videotex users all over Austria. Additional fees have to be paid for by the information providers for the use of data base capacity at the videotex center.

Recently, in cooperation with the PTT the Technical University at Graz developed an intelligent programmable decoder for videotex (MUPID = Mehrzweck Universell Programmierbarer Intelligenter Decoder) that can now be rented from the PTT together with the modem for a small additional fee. MUPID provides access to videotex for a greater number of TV sets.

Equipment and Interconnection Policies

As a general rule, the Austrian PTT has not provided modems and data terminal equipment for use on the public telephone network and on leased lines. These must be procured by the user separately. The PTT does, however, exercise supervisory and type approval authority over such subscriber equipment. Responsibility of the PTT ends at the line interface.

On the newer public data networks, however, all modems and data connection devices (DAGs) are supplied by the PTT while terminal equipment must be obtained by the subscriber. Too, on the new videotex service, only PTT provided modems are allowed. No private equipment can be directly attached.

With regard to terminal equipment, only private equipment can be used on all networks. An exception to this is the videotex service where it is at the user's discretion whether to use a privately purchased decoder or to rent the intelligent programmable decoder MUPID from the PTT. Connection of private terminal equipment is made via data connection devices (DAG = Datenanschaltgerät) which are provided by the PTT. No private connection devices are allowed, the reason given being that the PTT has implemented certain testing facilities within the DAGs that permit prompt diagnostics of all parts of the system in case of failures.

As in Germany, PABXs may be obtained as "PTT owned" or "subscriber owned" from the PTT. In addition, equipment may be obtained privately. For PTT supplied equipment connected to the public network, there is a minimum rental period of five years.

For telex, only the basic telex connection is provided by the PTV; the teleprinter and all other subscriber equipment must be obtained privately. PTV personnel take charge of the installation work, and maintain their own installations. The subscriber must arrange maintenance of his own equipment. The Fernmeldetechnisches Zentralamt (FZA) in Vienna is responsible for granting approval for private equipment.

Type-Approval

In all cases, private equipment connected to PTT-provided equipment has to be approved by the PTT, i.e., the modem but not the terminal equipment has to be approved for connection to leased circuits; the terminal equipment for connection to PTT-provided DAGs, and, presumably, the TV sets connected to PTT-provided modems for Videotex service. The process of type-approval can be seen in two parts: Standards for network interfaces and protocols are set by the Austrian Standards Institute (Osterreichisches Normungsinstitut) in accordance with international standards. This institute is an independent organization although the PTT has representation therein in addition to other groups. All standards go through a process of public reviewing before they are finally published.

In compliance with these standards the telecommunication engineering center (Fernmeldetechnisches Zentralamt) of the PTT draws up the detailed specifications for all equipment that is to be connected to public networks or private circuits. The actual procedure of type-approval is carried out by the PTT through extensive testing of the equipment under consideration. For certain kinds of services it is not enough to approve of the hardware. In some cases the software also has to fulfill standard requirements. Therefore, certification is not always given permanently to a certain type of equipment but rather to an entire system and has to be renewed whenever major changes of the software have occurred. This applies in particular to teletex terminals where all levels of the teletex protocol have to be implemented and are subject to certification.

A mandatory software test plug for X.25 is under consideration.

The PTT does not impose any conditions on the provision of maintenance for any private equipment attached to the public networks. The PTT takes no action beyond the procedure of certification of private equipment. It is solely the user's responsibility to keep his equipment compatible with the respective network interfaces.

Since only a small share of the computer market is held by Austrian equipment manufacturers, no restrictions are imposed on foreign equipment. The PTT makes no difference between Austrian and foreign equipment in the certification process. Besides the equipment type approval, the certification of individual terminals is also possible but not very common due to high costs.

No major modifications of the certification policies have taken place recently and are not expected apart from the software test plug that is still under discussion.

Foreign Ownership

The monopoly position of the PTT does not allow any private institution - domestic or foreign - (with the exception of the aforementioned services of Radio Austria) to offer any data transmission services in this country. These are no legal restrictions, though, for private firms to offer value added services (e.g. data base access) via public data networks. This applies for Austrian and foreign organizations alike.

Information Processing/Services Policy

A large number of institutions offer access to a variety of public data bases, the largest ones being the data bases of the various Vienna-based international organizations. No restrictions apart from data privacy measures are placed on transborder data flow either. International data bases (e.g., INPADOC) are set up in Austria and subscribers in this country have free access to foreign data services (e.g., TELENET, TYMNET, databases all over Europe and overseas).

In close cooperation with the Technical University at Vienna the PTT has successfully tested connections to EURONET and hence to the services of the DIANE network, but so far no final agreement has been reached between the European Community and the Republic of Austria with regard to regular access to EURONET/DIANE.

Prospective Changes

Interconnection of Local Area Networks to Public Networks

Recent technological developments lead to a considerable degree of integration of telecommunications services. This can be observed especially in the field of local area networks (LAN) where products that integrate voice, text, data, facsimile and video communication are now available on the market. The interconnection of LANs to public networks is technically possible today so that new policies from the PTT regarding these issues will be required in the near future. So far the Austrian PTT has not acted in this respect. Policy developments can be expected as soon as the new public data networks are fully operational and new user demands evolve.

A research project financed by the Ministry of Science and Research, aimed towards the establishment of a computer network between several Austrian universities (ACONET), could have some bearing on this matter. The policies of the PTT towards the interconnection of local area networks (LANs) to public data networks could be influenced by the findings of this project.

Expanded Videotex

Developments are also under way with regard to videotex. Technical and administrative provisions are in preparation to establish external computer connections to the videotex center. It would then mainly work as a switching center between private videotex subscribers and information providers operating at their own computer system.

Software Type-Approval?

Important changes might take place with the specifications for type-approval of equipment. Presently the discussion centers on the X.25 software test plug. A decision about including it in the process of type-approval is imminent.

BELGIUM

Organization Structure

Responsibility for telecommunications in Belgium resides in the government department Regie des Telegraphes et des Telephones (R.T.T.) popularly referred to as the 'Regie'. * Regie reports to the Minister of Posts, Telegraphs and Telephones and is a financially autonomous entity. It has no responsibility for postal services. In addition to telecommunication services, Regie provides bearer circuits for CATV companies. Regie administration is the responsibility of the General Administrator (Administration Generale) accountable to the Minister.

Policy control for Regie equipment, policies, specifications, procurements, authorizations and type-approvals is vested centrally in the office of the Counsellor General of Equipment.

Service Policies

R.T.T. is the monopoly supplier of all domestic and international telecommunication services and private leased circuits. There are no signs that this condition of monopoly supply will be changed.

Policies regarding international leased circuits and resale and sharing adhere strictly to the terms and conditions of CCITT Recommendation D 1.

Access to the public network from international leased circuits is not permitted. However, voice telephone calls may be allowed according to CCITT D 1 if the following conditions are met:

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*Prior to 1930, the responsibility for the provision of telegraph and telephone services fell under the Administration des Telegraphes et Telephones which was a government body, with a rather loose monopoly for the provision of such services. On July 19, 1930, R.T.T. was created, and granted an absolute monopoly in specified areas of telegraphy and telephony services.

A. the circuit end is located at the customers premises;

B. all calls are strictly related to the client's business;

C. in case of international leased circuits with access to the public network, these calls are made only between persons previously designated by the client and authorized by the administrations concerned.

The R.T.T. charges 17% Value Added Tax (VAT) on international leased lines (19% from 1.01.83).

Telex Service

Telex subscribers number about 23,000 with connections growing the last few years about 1,200 subscribers per annum. International telex connections are switched through two international electromechanical switching centers, one at Brussels and one at Antwerp. The Brussels interconnection center provides worldwide access while the Antwerp exchange primarily services the surrounding countries. There is also a combined store programmed controlled exchange at Brussels that treats the international traffic from the U.S. and from and to some European countries for the subscribers connected to the SPC exchanges at Antwerp, Bruges, Courtrai, Ghent and Liège.

As is practiced by most European PTT's, telegraph service is provided over the telex network. In common with other PTT's, Belgian telegraph traffic has been steadily declining. Telex lines can also be used for 50 baud data transmission. R.T.T. approval is required for private equipment to be connected to the telex network.

Data Transmission

Data can be transmitted over the telex network (speed = 50 baud)); the public switched telephone network (PSTN = datel), private leased circuits and starting from the 1st of December 1982 the public packet switched network (named DCS = Data Communication Service).

The DCS network was opened with 11 nodes and 1 Network Control Center situated in Brussels. In 1983 11 other nodes will be installed.

The DCS is interconnected with the same networks in the USA, Spain, Germany, United Kingdom, France, Singapore, Japan, Canada, Sweden and Euronet. Other networks will be interconnected in 1983.

Access to the Telenet and Tymnet value added packet switched networks was opened in August 1977 through a concentrator installed at Brussels. This service will be incorporated in 1983 into the public DCS network. At that time the concentrator will be suppressed.

International Carriers

Belgium recently made an inquiry among U.S. international carriers as to the possibility of entering into an operating agreement with one or a limited number of carriers, for new services carried by public data communication networks between the USA and Belgium. This inquiry does not include services provided over the PSTN (voice) or telex networks. There is reason to believe that only the "possibility" was being investigated and that there is no real threat to the existing carrier structure. However, there remains the "possibility" that selected new services may be authorized through fewer or even one carrier.

Equipment Policies

Subscribers have to lease their telephone set from the R.T.T. They can buy special equipment (answering machine, alarmset, automatic dialler,...) but those equipments must be approved by the R.T.T.

Every private company may submit such equipments to the R.T.T. for type approval.

The R.T.T. has also the monopoly of small PABX and Intercom systems up to two trunk lines and 11 telephone sets.

The R.T.T. is in competition with private companies for systems with 5 trunk lines and 25 extension lines.

Systems with a higher capacity must be purchased by the subscribers from approved companies.

The Belgian telephone switching market is shared by two nationally-based manufacturers, BTM (an ITT subsidiary) and ATEA-GTE. Most of this market presently is dominated by BTM.

The Belgian telex switching market is shared by BTM and Siemens.

The PSDN is supplied by Siemens.

Information Processing Policy

There is no explicit information processing policy nor direct regulation of data processing services. However, these services will be impacted by policies favoring the national packet switched network; restrictions on private circuit interconnection to public services and biases to European networks (such as Euronet).

Future Competitive Access

As can be seen from the above, future competitive access to Belgian telecommunication and information service markets will be constrained by a sustained commitment to monopoly supply of domestic services and the possibility of reducing the number of U.S. international carriers that have access to Belgian service markets.

Belgian equipment markets, though partially open, are mainly open (allocated) to already entrenched suppliers, predominantly made up of two U.S. and two European (e.g. Siemens, Phillips) suppliers. Thus, the openness to newcomers is constrained not so much by national policy as existing market relationships. This situation exists, of course, in many countries.

The 'part-monopoly, part-competitive' situation for equipment provisioning is not expected to change.

Additionally, Belgian officials have told us that there is a strong governmental effort through several "National R&D programs" to go ahead in the conception and production of Belgian equipment for advanced telecommunications and office automation (in French: télématique and bureautique"). Companies involved in these programs are the same as those identified above. Consequently, these equipment markets, as with the traditional cases, would be somewhat open but "open" to government preferred and approved suppliers.

BRAZIL

Until the late 1960s the telephone network in Brazil, like many countries in Latin America, was fragmented and non-uniformly available. Generally, outside of several municipal systems, telephone companies were privately owned, generally by foreign (Canadian) interests. There was almost no rural service and no reliable long-distance network.

In response to this situation, the Telecommunication Law 4,117, which provided for a completed restructuring of the telecommunication sector, was approved in August 1962.

Beginning in 1967 the government of Brazil nationalized all interstate services under EMBRATEL which is 97% Federal Government owned. Intrastate services in Brazil's provinces and urban services in major cities remained the domain of federal, state, municipal and private companies. All telephone companies, federal (there were three), state (some 600) municipal (200) and private (90) came under the direct management supervision of TELEBRAS which under the acts of 1966/67 has vast authority to regulate, standardize, plan and coordinate the operation of all Brazilian Telephone Companies. Subsequently, these companies were merged, nationalized or purchased to reduce the total number of local companies to 25.

Today, the TELEBRAS system consists of 25 corporations, which serve the telecommunication needs of the Brazilian states. The 100,000 employees of the TELEBRAS system operate 8.5 million telephones, which provide almost all of Brazil's cities and settlements with automated service.

This government intervention has resulted in a very rapid growth in the Brazilian telephone system--to the extent that Brazilian service, at least on long-distance trunks and in major cities served by government owned companies equals that of most European nations.

The establishment of TELEBRAS in 1972 also marked the beginning of a second stage of Brazil's telecommunication development. Its objectives are the digitalization of the public networks, the preparation of an adequate infrastructure for telematics services and the development of a national technological capability in this sector.

Service Policies

Almost all services are provided by TELEBRAS over the public switched network. Some limited point-to-point private line services are still allowed but resale and sharing are not. In the near future it is their intention that all services will be obtained from the public switched network.

International services, once the domain of U.S. multinationals, are also now a government monopoly, controlled by EMBRATEL which provides all international service and international satellite services.

All telecommunications services, domestic and international are under the jurisdiction of the Ministry of Communications.

After TELEBRAS had succeeded in unifying the Brazilian national network into a single long distance and international carrier interconnected with 25 state-owned local companies, it turned its attention to the upgrading of key network components to accommodate public data services. Thus, in the past two years national data networks TRANSDATA and SICRAM were implemented in the developed coastal region. The former went into operation in 1980; by the end of 1981, more than 300 localities were serviced through over 4,000 network termination points. The latter is a computerized system for the automatic storage and retransmission of messages and operates either through terminals that are directly linked to EMBRATEL or connected through the national telex network. Currently, a value-added public packet-switched network, which is scheduled to begin operation in 1983, is being implemented.

Currently, planning is underway to extend the public data networks and to put in place the government-owned and operated public packet-switched network. It is impossible to imagine that, having recently centralized telecommunications activities, Brazil would allow any new entrant into this industry.

Equipment Policies

All equipment purchased by all companies must meet technical standards set by TELEBRAS. All equipment is supplied by local telephone franchises. Preference in equipment purchases is given to equipment manufactured in Brazil, much of which is manufactured by Brazilian subsidiaries of U.S. multinationals particularly GTE. However, the Brazilian government has, since 1978 been engaged in the process of either forcing the sale of major equity shares in these affiliates to Brazilian firms or replacing these suppliers with Brazilian owned firms. To this latter end, research by TELEBRAS into new telecommunications technologies has been freely transferred to Brazilian corporations.

Brazil's over-all industrial policy is geared towards the reduction of unnecessary imports and the creation of incentives for local production; the procurement choices of the TELEBRAS system have helped to realize these ends. The country's national telecommunication industry has adapted and operated new technologies. In this respect, the Research and Development Center of TELEBRAS (CPqD) has played an important role. It has initiated a variety of projects that interface with and strengthen national industry and universities. CPqD has already developed, among other products, a keyboard telephone set and digital transmission equipment. It is presently developing a family of time-division stored program-controlled switching systems, optical fibres and earth stations for satellite communications. Brazil-owned telecommunication corporations will soon supply the greatest part of the national market. The net result of these policies is the drastic reduction of sales by U.S. firms in Brazil in favor of dramatically increased purchases from Brazilian corporations. The ultimate goal of this policy is the exclusion of non-Brazilian firms from the Brazilian telecommunications equipment market.

Information Processing Policies

Brazil, as of 1970, had no information processing industry. Since that time the government has developed significant effort into the development of a domestic information processing equipment industry. This policy thrust, to seek information processing independence was first placed with the government Coordinating Commission for Data Processing Activities and then with the Special Secretariat of Informatics. A key part of this policy involves the protection of domestic Brazilian data processing equipment industry from foreign imports.

In a similar vein government policies are targeted at reducing Brazilian dependence on foreign information service industries both within Brazil and internationally. This policy has evolved into one of maintaining Brazilian control over all information processing services offered in Brazil. As part of this policy, the government has taken affirmative action to restrict entry by foreign data service providers and at the same time to establish government-owned or controlled information service companies (SERPRO, a service bureau nationalized by the government: PRODASEN, a federal data base network, and ARUNDA a public data processing and storage network). The eventual goal is to absolutely limit all information processing services to those provided in Brazil by Brazilian owned firms.

Brazil's Informatics, Telematics and Transborder Data Flow Policies

Brazil has developed and implemented coordinated policies governing the interrelated fields of telecommunications, informatics, telematics and transborder data flows. An understanding of these coordinated policies is necessary to understanding Brazil's equipment policies; information processing policies and international communication services policies. For these reasons, and also because it represents the most developed set of policies by any nation, developed or developing. These policies are reviewed and summarized here.

National Informatics Policy

The event that marked the beginning of the informatics sector in Brazil was the creation, in 1972, of the Coordinating Commission for Data Processing Activities (CAPRE), a governmental commission established to rationalize the use of electronic data processing by government agencies. After four years of activities - and after the petroleum developments in 1974 had led to a drastic worsening of the country's balance of payments - CAPRE was assigned the additional task of formulating an industrial policy for information. For that purpose, it also was given the competence to manage, in the interest of fostering the growth of a national informatics industry, customs mechanisms in connection with the import of data-processing equipment and, particularly, parts and components. This policy was formulated in view of the opportunities that the micro-electronics and revolution offered by reducing, at least for the time being, the handicaps that new-comers have in any industrial field. As a central part of this policy, the minicomputer, modem and video-terminal markets - which had not yet emerged in the country - were defined as protected segments of the market.

CAPRE's responsibilities were assumed and extended in 1979 by its successor organization, the Special Secretariat of Informatics (SEI). This new institution consolidated CAPRE's policy and pursued a strategy to enhance the capabilities of national industry to manufacture increasingly complex technologies. As part of this policy, foreign affiliates are encouraged to exercise their comparative advantage and to produce advanced state-of-the-art computer goods and services, both for local consumption and export; they are also encouraged to improve local research-and-development facilities. Once a product can be manufactured with national capital, the respective market segments are protected to give the infant industry an opportunity to develop, while foreign affiliates are encouraged to shift towards more sophisticated products (instead of upgrading products in the same segment). The degree and type of protection is a function of the technological stage of the products involved. It is envisaged that as soon as international competitiveness is achieved, protective barriers can be lowered, although measures may be considered necessary to ensure the continued improvement of local technologies and the performance of national ownership of the country's informatics industries.

Brazilian industry's share of the rapidly growing domestic informatics market rose to 35 percent by 1981, with 69 private and one public corporation producing approximately 70 informatics products, already some of them for export. Significantly, the share of data equipment produced with local technology rose from 31 percent in 1979 to 53 percent in 1981, and the role of imported inputs for manufacturing declined from 29 percent in 1979 to 8 percent in 1981. Professional employment in the industry rose considerably, with over 40 percent of the employees with a university degree in foreign affiliates working in marketing (compared to 4 percent in hardware and software development, both of which are research-and-development intensive) and 40 percent of the same type of employees in domestic companies in hardware and software development (compared to 15 percent in marketing).

The Government of Brazil is now venturing beyond the data-processing equipment market and embarking on efforts in other fields, including real-time control systems, software and microelectronics. Research-and-development centers, the encouragement of the establishment of certain industrial plants, measures for government procurement and fiscal incentive policies are all being brought to bear on these objectives. The Government has deemed the implementation of these policies crucial for the strengthening of the country's domestic information resources and the international competitiveness of Brazil's informatics industry.

Brazil has issued two sets of presidential guidelines - one on telecommunications, the other on informatics - that establish priorities for telematics and transborder data flows. The general objectives of these instruments are the same as those guiding the Government's over-all policy in these areas.

Specific attention is given to the creation of an efficient, reasonably priced and specialized telecommunication infrastructure of public-switched networks that would utilize and enhance local capabilities; the development of data bases and data-base services (including information retrieval and data storage); and the promotion of telematics networks and services (e.g., videotex).

In this context, data-communication specifications are being standardized. As a result, different data-processing equipment are made compatible, hardware is standardized, economies of scale are created for the national industry and small users have a better opportunity to participate in the informatization process. Telematics industries benefit from the Government's market-protection policy which has the purpose of consolidating the country's infant industry in this area. At the same time, the Government seeks to create a competitive environment for domestic services, to maintain national control over data services, to encourage data structuring in Brazil and to assure privacy protection of personal data.

Transborder Data Flow Policy

Brazil views the increased availability of information as an opportunity to bridge gaps that exist between nations. Transborder data flows via transnational computer-communication systems play a particular role in the process because they contribute to a transfer of such information resources as computer hardware, software, data bases and information jobs. Since information resources are considered to be crucial for decision-making and major sources of economic and political power, their location and use are of great importance. As transnational corporations are the principal users of transnational computer-communication systems, the Government's policy focuses on them.

These computer-communication systems are not only used for standard internal communication purposes, but also to assist in the performance of a variety of functions that would otherwise be undertaken by foreign affiliates. These systems can therefore change the manner in which foreign affiliates conduct their operations in any industry and, ultimately, they can have an effect on development processes. Most of the effects are based on the location of information resources and the impact this has on the autonomy of corporate systems.

For instance, a foreign manufacturing affiliate initially submitted an application for a system that had as its principal purpose the closer integration of its affiliate in Brazil into the international corporate data-communication network of the parent corporation. More specifically, the system was meant: to be used to send and receive administrative correspondence in general; to perform production and procurement planning abroad; to utilize information resources located abroad for the maintenance of installed equipment; and to perform marketing planning and support operations abroad (including the description of equipment configurations for given user applications). After considerable negotiations, the transnational corporation agreed to transfer certain applications to Brazil, including some administrative uses that had originally been allocated to the parent corporation; to this end, the corporation was allowed to import data-processing equipment. Furthermore, it was agreed that the entire maintenance system, marketing planning and support operations as well as production planning would be transferred to Brazil within a reasonable period of time. Of the initial uses of the link, only the updating of local copies of the corporate data base was allowed since this was considered important for the corporate system as a whole. The foreign affiliate also remained integrated into the parent corporation's global communication system for all remaining purely administrative uses.

In the light of this type of situation, Brazil has formulated four principal objectives which determine the direction of the country's policies regarding information resources: (1) to maximize information resources located in Brazil, be they imported or locally produced; (2) to acquire and maintain national control over the decisions and technologies relating to Brazilian industries; (3) to broaden public access to information; and

(4) to administer information resources in such a manner that they enhance the country's cultural and political environment. These four objectives have led to considerable efforts to build the necessary infrastructure - an appropriate telecommunication network and a viable informatics sector- and they have given rise to clearly defined policies regarding telematics (the merger of telecommunications and informatics) and transborder data flows (the extension of telematics to the international realm). The ultimate aim is to create information industries and linkages that contribute positively to Brazil's over-all development within the context of the country's industrial policy. This goal is pursued with caution so as to minimize conflicts of interest with transnational corporations.

Transborder Data Flow Regulation

Brazil regulates international data-communication links to ensure that such links are set up and used in accordance with the guidelines of the national informatics policy and transborder data flow policy. Such links are approved for specific purposes only and for fixed periods of time, which can be extended for up to three years.

The regulation is based on the principle that information and the means to treat it are economic resources, subject to trade and crucial to socio-economic development. Furthermore, data structuring is considered as an activity closely bound to national security. The right to regulate the nature of transborder data flows by any country is, therefore, supported by Brazil. The Government has determined that the establishment of any link should not jeopardize the operations of the local units in case of an interruption of the link; it should not lead to an outflow but an inflow of information resources; and it should not affect negatively the country's balance of payments.

Brazil's transborder-data-flows policy consists, therefore, primarily of the application of criteria used to evaluate under which conditions and to what extent individual applications for links fit with these over-all and specific objectives and, hence, merit approval. The criteria are based on two dimensions of transborder data flows: the categories of transborder data flows - commercial and corporate* - and the types of use to which information resources are being put in their transnational computer-communication systems - person-to-person data communication, data-base access and data processing. Approval of transnational computer-communication systems depends on which intersection of these dimensions is involved (see Figure I).

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*Brazil distinguishes between two types of transborder data flows: commercial transborder data flows, in which data are actually the object of trade and the corporate transborder data flows, in which data are used only to support other economic activities.

Since the policy on transborder data flows was established in 1978, 32 applications for transnational computer-communication systems have been submitted to CAPRE and SEI. Of these, 23 were approved, 7 refused and 2 were pending as of March 1982.

Five of the seven links whose installation was not permitted involved access to data services abroad. The principal reason for rejecting the applications was that the corporations involved had not ensured that information structuring or information resources would be located in Brazil. The approved links contain those whose uses, because of negotiations between SEI and the applicants, were changed to meet Brazil's transborder-data-flow policy requirements. The administration of transborder-data-flow links is not seen to have affected significantly corporate flows. Adaptations had, however, to be made by commercial data-service corporations which had not ensured that data structuring or information resources would be located in Brazil.

Given the importance of foreign transnational corporations in Brazil, as well as the growing importance of Brazilian-based transnational corporations abroad, the almost exponential growth of links since August 1981 is likely to be maintained in the foreseeable future at a rate of three applications per month. This growth will be further supported by the introduction near the end of 1982 of a TELENET node, which will constitute an international data-communication gateway and will provide specialized international channels for the transport of digital data, thus making light traffic applications for data communication more economically feasible. The gateway will become Brazil's basic instrument for its transborder data flow policy. Future growth most likely will continue to be concentrated in the area of transnational corporations, although data services can also be expected to become important. There are also two closed user-group links through EMBRATEL and AIRDATA with the Société Internationale pour la Télécommunication Aéronautique (SITA) network; in 1983, the links of the Society for Worldwide Interbank Financial Telecommunication (SWIFT) network will be added.

Figure I. Brazilian transborder data flow policies

		Category of on-line transborder data flows	
		Corporate	Commercial
On-line use of transborder data flows	Data communications	Person-to-person communications are not restricted.	Brazilian PTT only; co-operation agreements possible.
	Data-base access	Copy of data base in Brazil, whenever reasonable.	Encouraged, but if co-operation with Brazilian institutions, preferably with copy of data base in Brazil. If no local copy, services are provided by the PTT, although co-operation agreements are possible.
	Data processing (including use of software)	Not favoured abroad if reasonable local alternative exists.	Not allowed abroad, except in exceptional circumstances.

Source: Brazil, Special Secretariat of Informatics.

Future Competitive Access

As one may have determined from the above, prospects of future competitive access to the Brazilian market, either for foreign based data services or equipment are very limited. Foreign firms will be allowed entry if:

- they locate data service facilities in Brazil
- utilize, to the extent possible, Brazilian produced equipment
- open manufacturing facilities which produce high-technology equipment not in competition with existing Brazilian firms
- they are prepared to eventually relinguish control and ownership of all of the above to Brazilian investors or the Brazilian government.

CANADA

Organizational Structure

The Canadian telecommunications network is actually quite representative of Canada itself. Until 1867 Canada did not exist but rather was a collection of separate colonial provinces. It was not until the late 1920's to early 1930's (historians differ) that Canada emerged from near-colonial status to that of an independent nation.* Out of this environment has emerged a unique telecommunications network that mirrors the unique Federal-State political organization of Canada. As a result, Canada presents a complex mixture of federal and provincial legislation, policies and regulation. Unlike the situation in many countries where there is a state controlled Post, Telephone and Telegraph (PTT) organization, the Canadian telecommunications industry consists of a mixture of private, governmental and joint private-governmental corporations and organizations. These are generally regulated by a single federal or provincial regulatory agency.

This blend of private and public systems with centralized government planning is uniquely Canadian and has led to a rapid growth in the Canadian network to the point where Canada is second only to the U.S. in telephones per 100 population (96).

Regulatory Structure

Telecommunications regulatory jurisdictions in Canada have evolved to the present structure whereby carriers are regulated on their entire operations by either the federal agency, the Canadian Radio-television and Telecommunications Commission (CRTC), a provincial government utility board (or, as is currently the case in Saskatchewan, by the provincial cabinet), or in some cases, by a municipal council. A list of major Canadian telecommunications carriers and their respective regulatory agencies is given in Table 1.

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*Telecommunications development paralleled this national development. A milestone in the development of a national telecommunications network in Canada was the 1931 agreement between major regional telephone companies to set up the TransCanada Telephone System. One of its major achievements was the establishment of an all-Canadian route for long-distance telephone calls.

TABLE 1

MAJOR CANADIAN TELECOMMUNICATIONS CARRIERS AND THEIR REGULATORY AGENCIES

CARRIER	REGULATORY AGENCY
Bell Canada	Canadian Radio-television and Telecommunications Commission (CRTC)
British Columbia Telephone Co.	
CNCP Telecommunications	
Telesat Canada	
NorthwesTel	
Terra Nova Telecommunications	
Alberta Government Telephones	Alberta Public Utilities Board
Saskatchewan Telecommunications	See Note 1
Manitoba Telephone System	Manitoba Public Utilities Board
New Brunswick Telephone Co. Ltd.	New Brunswick Public Utilities Board
Maritime Telegraph and Telephone Co.	Nova Scotia Public Utilities Board
Island Telephone Co. Ltd.	Prince Edward Island Public Utilities Commission
Newfoundland Telephone Co. Ltd.	Newfoundland Public Utilities Board
Edmonton Telephones	City of Edmonton
Northern Telephone	Ontario Telephone Service Commission
Quebec Telephone	Régie des services publics du Québec
Telebec Ltee	Régie des services publics du Québec
Teleglobe Canada	See Note 2
Thunder Bay Telephone System	City of Thunder Bay

Note 1: Saskatchewan Telecommunications is not presently regulated by an independent agency but is owned and subject to control by the Saskatchewan government. In July, 1982 the Saskatchewan government passed an Act to establish a Public Utilities Review Commission. As of September, 1982, the Act had not come into effect.

Note 2: Teleglobe Canada is not regulated by an independent agency but is owned and subject to control by the federal government.

Generally speaking, federal and provincial governments determine telecommunications policy within their respective jurisdictions. Usually, carriers must apply to their regulatory agency for approval of the terms and conditions on which service is provided. The origin of telecommunications regulation was to protect subscribers against monopoly providers of telecommunications services. The role of the regulatory agencies has evolved into a broader oversight of telecommunications carriers, which generally are regulated by the approval or disapproval of carrier applications, according to the provisions of governing legislation. It is important to note the power of the federal Cabinet to vary or rescind any CRTC telecommunications decision but this power is exercised sparingly and usually only when significant or broad public policy issues are involved.

Industry Structure

In Canada, there are two national telecommunications systems, namely the TransCanada Telephone System (TCTS) and CNCP Telecommunications (CNCP) which together account for approximately 93% of the $6 billion telecommunications carriage market.

TCTS is an unincorporated association of the largest telephone company operating in each province plus Telesat Canada, the domestic satellite carrier. Thus, the member companies of TCTS are:

British Columbia Telephone Co.
Alberta Government Telephones
Saskatchewan Telecommunications
Manitoba Telephone System
Bell Canada
New Brunswick Telephone Co. Ltd.
Maritime Telegraph and Telephone Co.
Island Telephone Co.
Newfoundland Telephone Co. Ltd.
Telesat Canada

Each of the principal Prarie telephone companies, i.e., Alberta Government Telephones, Saskatchewan Telecommunications and the Manitoba Telephone System, are owned by their respective provincial governments. All the other members of TCTS, with the exception of Telesat, are privately owned. Bell Canada, which operates in Ontario and Quebec, is the largest member of TCTS, has 58% of the telephones in Canada, is owned by a large number of mainly Canadian shareholders and has significant direct and indirect equity interests in the principal telephone companies in each of the Atlantic provinces - New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland. The British Columbia Telephone Company, the second largest telephone company in the country, with approximately 11% of the telephones, is indirectly owned and controlled by the U.S. based General Telephone and Electronics Corporation. Telesat Canada is jointly owned by the federal government and by the major common carriers.

The members of TCTS provide a range of facilities for the transmission and switching of local and inter-exchange traffic, including two coast-to-coast microwave relay routes. Long distance traffic is also carried on co-axial cable and via Telesat Canada satellites and earth stations.

CNCP Telecommunications is a partnership of the telecommunications divisions of the major Canadian railways, i.e. Canadian National Railways (government owned) and privately owned Canadian Pacific Ltd. CNCP, formerly a national telegraph carrier which grew up with the transcontinental railroad, has gradually expanded its service offerings, in large part, due to CRTC decisions to grant them wider system interconnection. CNCP operates its own national microwave relay system and its own switching centers but in general leases local loops from local telephone companies.

A significant development in recent years was the 1979 CRTC decision that permitted CNCP to interconnect its facilities with Bell Canada's local telephone network. This allows CNCP's customers to access its competitive data and voice services via the local Bell Canada telephone network. A similar 1981 CRTC decision permitted CNCP to interconnect its facilities with those of the British Columbia Telephone Company. CNCP is pressing to obtain similar interconnection arrangements throughout Canada.* The result of the system interconnection currently granted to CNCP is to significantly increase its ability to compete with TCTS in the provision of a wide range of business services, both data and voice. However, CNCP has sought direct interconnection with Bell Canada at the class 4 office level; CRTC has refused to mandate such interconnection.

Bell Canada Reorganization

In June 1982, Bell Canada announced plans to reorganize its corporate structure. As part of the reorganization, Bell Canada and several of its subsidiaries would become the subsidiaries of a holding company, Bell Canada Enterprises Inc. The purpose is to achieve a greater separation between its regulated and unregulated activities. The reorganization raises questions regarding effectiveness of CRTC regulation of the reorganized structure. The federal government has directed the CRTC to inquire into the proposed reorganization.

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*CNCP applied to the CRTC in 1982 for interconnection with Alberta Government Telephones. Serious jurisdictional questions are raised in this proceeding.

Service Policies

The telephone companies (in their respective operating territories) have a monopoly on switched public voice telephony and CNCP has a monopoly in the provision of public message (telegram) services. In all other service categories, there are varying degrees of competition between TCTS and CNCP. [Note Table 2]. All overseas telecommunications services are provided through Teleglobe Canada.

TABLE 2

OVERVIEW OF TELECOMMUNICATIONS SERVICES AND CARRIERS

Service Category		Carrier Category
1. Voice telephony	Public switched	TCTS and other telephone companies
	Leased circuits (private lines)	TCTS, other telephone companies and CNCP
2. Public message (telegram)		CNCP
3. Switched Teleprinter		CNCP (Telex) and TCTS (TWX)
4. Data	Public switched	TCTS and CNCP
	Leased circuits (private lines)	TCTS and CNCP
5. Text		TCTS and CNCP
6. Program Transmission	Audio	TCTS and CNCP
	Video	

Telephone Service

Domestic local and long distance public voice telephone services are provided by the TCTS member companies and by other telephone companies and cooperatives. Most of the TCTS companies have border-crossing points and inter-carrier agreements with U.S. carriers for the carriage of transborder (Canada-U.S.) traffic. Traffic to other countries is handled by the international public telephone switches of Teleglobe Canada. Telesat Canada has entered into discussions with U.S. satellite carriers concerning arrangements for transborder satellite traffic.

Switched Teleprinter Service

CNCP and TCTS compete in the provision of switched teleprinter services. Telex, provided by CNCP has more than 50,000 Canadian subscribers. The comparable TCTS services, Teletypewriter Exchange (TWX) service, has a smaller number of Canadian subscribers. Both services allow access to over one million telex or telex-type installations around the world.

Data Services

Each of CNCP, TCTS and (for overseas service) Teleglobe Canada provide public switched data network services. Two of the major competitive service offerings are Infoswitch and Datapac. Infoswitch, provided by CNCP, is a nationwide, digital switched data communications network which offers both circuit and packet switching facilities to users. Charges for use of the Infoswitch network consist of transmission and access components. Transmission charges vary with volume more than with distance. Access charges are fixed monthly amounts which are directly related to terminal transmission speed.

Datapac, provided by TCTS, is a nationwide packet switched public data network. Datapac rates are volume and distance sensitive. Excluding installation and optional features charges, each service has two main rating elements: access and network usage charges. The access charge varies with each Datapac service offering while the usage charges are based on the number of packets transmitted.

There are few restrictions on the use of the public data networks so long as technical criteria are met. Thus, terminal attachment policies with respect to public data networks have been considerably more liberal than for voice; the primary concern has been to prevent damage to the networks. The use of coupling devices leased from or approved by the carrier is required by some carriers.

Leased Circuits

In most regions in Canada, leased circuits are readily available, on a competitive basis, from telephone companies and CNCP. Included in this category are circuits leased for the transmission of audio and video program material. Rates for leased circuits are largely determined by competition, subject to approval by a regulatory authority. As a result of competitive and regulatory influences, telephone company and CNCP charges for leased circuits are comparable. Customers are able to choose between public network offerings and leased facilities according to what best suits their needs.

Resale and Shared Use

The sharing and resale of leased circuits is not generally permitted. The terms and conditions governing the provision and use of private leased circuits are normally incorporated in a carrier's tariffs or in a contract between a carrier and a user, either of which would usually require the approval of the appropriate regulatory agency, subject to any governing legislation. Federal telecommunications law does not specifically allow or disallow the shared use or resale of private leased circuits. This would normally be a decision to be taken, in the first instance, by the appropriate federal or provincial regulatory agency. There are, however, no resale carriers in Canada. Telephone companies do not permit resale and regulatory agencies have not objected. In the case of international leased circuits, relevant CCITT recommendations are applied by Teleglobe Canada.

Leased Circuit Interconnection

Interconnection of leased circuits to the public switched voice or data networks is permitted at the customer's switching equipment and also, in certain cases, within the telephone network. The attachment of customer-supplied terminal equipment is generally permitted subject to compliance with technical criteria.

International Services

International services are provided through the facilities of Teleglobe Canada via its international gateway switches, transoceanic cable or earth stations accessing INTELSAT satellites. Teleglobe Canada is a corporation owned by the federal government, which provides facilities, or otherwise arranges for telecommunications services between Canada and overseas points (but not U.S. traffic) including the provision of private switched networks and leased circuits. Teleglobe is Canada's representative in the

Commonwealth Telecommunications Organization, INTELSAT (the International Telecommunications Satellite Organization) and INMARSAT (the International Maritime Satellite Organization).

Both Infoswitch and Datapac can be connected to numerous other countries through Teleglobe Canada's Globedat international data Gateway which routes both packet and circuit switched traffic and provides low to medium speed data transmission. The service is accessible from the Canadian domestic networks of Datapac and Infoswitch. Other access arrangements may be provided if required. Charges are volume oriented and consist of two basic components applied at the call originating end, namely (1) the national network access charges, and (2) the international network usage charges based on volumes measured in kilocharacters or kilosegments and call duration in minutes.

New Services

Future plans call for the introduction in Canada of an integrated digital network (IDN) into those provinces served by private companies and over the interprovincial network. The first phase of this network is now well in place with the introduction of a nationwide packet and circuit switched digital network (Datapac) and the installation of Canadian made digital switches into toll and local offices. Bell Canada estimates that by 1990 almost 90% of Canadian facilities will be digital.

Teletex Services

TCTS and CNCP have recently announced competing services which would allow word processors made by different manufacturers to communicate with each other. The TCTS offering, known as Teletex conforms to international standards developed by the International Telegraph and Telephone Consultative Committee (CCITT). Similarly, the CNCP offering, Infotex, is compatible with CCITT standards. Both services will enable users to communicate nationally and internationally. The services will meet a wide variety of communications applications for users who have text preparation equipment. The overseas connections will be provided by Teleglobe, under the name of Globetex.

New Satellite Services

The two domestic carrier systems are now considering new communications services utilizing communications satellites and time division multiplexers. Users will be able to subscribe to specific voice, data or video services which have been designed to be capable of extending to other locations by linking them to existing terrestrial networks.

Cellular Mobile Radio Telephone Service Policy

In 1981 the Department of Communications (DOC) issued a discussion paper on radio-licensing policy and preliminary mobile-satellite planning in the band of 806-890 MHz and also invited public comments on policy options. In 1982, DOC announced that it will accept applications for radio licenses to operate cellular systems. A maximum of two systems per area will be granted. Applications were invited from: (1) regulated Canadian telecommunications carriers and (2) other applicants. The systems are to be technically and operationally compatible with each other and with systems operating in the U.S. This policy decision parallels the current U.S. situation.

Cable/Broadband Services

In addition to the traditional telephone carriers the CRTC has authorized certain cable TV companies to provide non-entertainment services over two-way systems. So far, such services are limited--but in time, especially with new demand for broadband facilities for digital transmission they could provide a real alternative to existing monopoly networks.

In Saskatchewan, early in 1982, the world's first commercial fibre optics telecommunications system to carry cable TV signals was inaugurated. The occasion marked the completion of the first section of a 3200 km fibre optics network. When completed in 1984, the new network will connect all Saskatchewan cities and 40 of the province's largest towns.

Microwave Licensing Policy

The present microwave licensing policy dates from 1970. Under existing policy, licenses for the ownership and operation of microwave facilities have been largely limited to telecommunications common carriers. The cable companies have pressed to be licensed to own and operate their own microwave facilities for program signal delivery. Policy review of this subject is presently underway.

New Services - Government Initiatives

The federal government is sponsoring a number of field trials of Telidon - the videotex technology which was developed by the Canadian Department of Communications. To encourage the development of new Telidon services, the Canadian Government instituted the Telidon Industry Investment Stimulation Program (TISP) in 1981. Under the Program, the Government will arrange to have 6,000 Telidon terminals built by Canadian firms and will make them available for use in new Telidon systems operated by the private sector. To date, fifty Telidon projects, including several submitted by telephone companies, have qualified to receive a total of $9.5 million under the TISP. Of particular note is the Manitoba Telephone System's Grassroots project - the first commercial Telidon system in the world.

The Government has also allocated funds to support field testing of Canadian "Office of the Future" technology. The money will be spent under the Office Communications System (OCS) Program to help Canadian companies develop the industrial capacity to supply the growing national and international markets for integrated electronic office products and services.

Equipment and Interconnection Policy

There is no national equipment policy in Canada. There is a range of policies governing terminal attachment that have been established variously by provincial or federal regulatory authorities. The CRTC has ordered the private companies to allow the connection of customer owned equipment to their provincial networks. Provincial companies have mixed regulations but generally still provide all terminal equipment.

There are no governmental restrictions on the sourcing of customer-provided terminal equipment as long as the equipment meets technical requirements that are approved by the appropriate regulatory agency. There is a trend towards liberalizing terminal attachment regulations subject to compliance with technical criteria. The technical standards being developed by the federal government Department of Communications Terminal Attachment Program Advisory Committee (TAPAC) are increasingly being recognized as the appropriate national technical standards.

The Terminal Attachment Program Advisory Committee is chaired by the federal Department of Communications (DOC) with the voluntary participation of certain carriers, manufacturers, suppliers, users and provincial governments. The object of the Program is to develop terminal attachment standards suitable for adoption on a nationwide basis. In order for equipment to be certified by DOC as meeting TAPAC-developed standards it must be tested by a DOC or DOC-approved laboratory. This procedure applies to all equipment regardless of origin. Standards for terminals to be attached to telephone networks have been published under the Program for network non-addressing devices as well as for network addressing devices such as single-line telephones, key systems and PBXs.

The attachment of network non-addressing equipment has been permitted for some time in several jurisdictions. Connection of customer-provided single line extensions, key sets and PBXs is permitted in the territories of Bell Canada and B.C. Tel (which together comprise about 70% of the Canadian market) under the terms and conditions of CRTC Decision 80-13 - Interim Requirements Regarding the Attachment of Subscriber-Provided Equipment. This decision was modified by CRTC Decision 81-23, Subscriber-Provided Terminal Equipment - Interim Technical Standards (issued November 16, 1981) which permits the attachment of terminal equipment which meets at least one of the following technical requirements:

(a) the equipment is of a class and manufacture which meets the requirements of the current issue of Certification Standards CS-03 approved by TAPAC;

(b) is of the same class and manufacture as that provided by Bell Canada or B.C. Tel to their respective subscribers; or

(c) is of a class and manufacture which meets the current requirements of Part 68 of the Rules and Regulations of the Federal Communications Commission of the United States.

The subscriber must submit to the telephone company a letter of attestation by a professional engineer qualified to practice in a province of Canada that his terminal equipment complies with the interim requirements. The telephone company must then sign a special agreement with the subscriber within thirty days. However, a "type approval" procedure applies as an alternative to special agreements for single line terminals provided that the manufacturer or supplier has provided the necessary attestation to, and has entered into a special agreement with the carrier. In this case, the subscriber may attach the terminal equipment without signing a special agreement, but he is required to notify the telephone company of his intentions. Suppliers are expected to encourage such notification through the provision of appropriate information to purchasers of extension telephones which have received the necessary "type approval". The CRTC has asked for public comment as to whether and to what extent Decision 80-13 should be modified to incorporate TAPAC-developed standards.

An in-depth public hearing on Terminal Attachment was held by the CRTC in November and December 1981. In a November 1982 major decision, CRTC set out general requirements that permit the attachment of a wide variety of terminal equipment to the networks of the federally regulated carriers provided that the equipment is certified as meeting federal Department of Communications' technical standards.

Foreign Ownership

Most Canadian telecommunications carriers are Canadian-owned. Principal exceptions are the British Columbia Telephone Company and Québec Téléphone, both of which are indirectly owned and controlled by the U.S. based General Telephone and Electronics Corporation. While there are no explicit restrictions on the ownership of Canadian telecommunications carriage facilities by foreign investors, these facilities are considered to be of strategic national importance. Therefore, any proposal to extend foreign ownership in this sector would probably be considered on a case-by-case basis. This is not to say that additional or new foreign ownership would necessarily be denied. However, there are no signs that such ownership will be encouraged and, for all practical purposes, additional foreign ownership of basic telecommunication facilities in Canada is not likely to occur. The outlook for value-added services and U.S. entry is more positive.

Certain competitive services are allowed, indeed encouraged, in Canada. Already a variety of value-added and resale carriers provide services. Further, there are no significant barriers to U.S. entities providing such specialized services or interconnecting with Canadian entities to offer such services. In this sense, at least U.S. Canadian services have already far surpassed the long sought ideal of transparent international telecommunications. More importantly, it does not seem to be the Canadian government's policy to limit telecommunications services in order to execute its more restrictive data communications policy.

Information Processing Policies

In this area, the fervent liberalism which marks most of the other sectors of the Canadian telecommunications industry breaks down. The Canadian government has long been worried about the domination of U.S. firms in the information processing sector. This concern is threefold:

First, there is great concern that U.S. dominance of this sector may cause an overdependence in Canada on U.S. industry. This, in turn, may leave Canada vulnerable should data or data services be withheld for economic or political reasons (the new ITRR regulations and pipeline embargo have not mollified this feeling).

Second, there is concern over loss of Canadian jobs in the vital information industry sector to Americans if such services are imported.

Third, there is a concern of diminished sovereignty if vast amounts of strategic or personal Canadian data is stored in the United States.

As a result, the government has adopted a general policy of encouraging the growth of an indigenous Canadian information processing industry through investment restrictions, data flow restrictions (in the form of restrictions on where certain data may be processed or stored) and direct assistance to Canadian information processing firms. It can reasonably be expected that this combination of restrictions and assistance will continue and even expand.

Future Competitive Access

In the telecommunications area, it is likely that competitive access to both service and equipment markets will continue to grow. There are no restrictions on the sale of U.S. equipment to Canadian customers and the Canadian equipment market is highly competitive. Most procurement by Canadian firms, however, is from Canadian companies, which are world leaders in the telecommunications interconnect market. The non-uniform terminal attachment policy can serve as an indirect barrier to greater market access for foreign providers.

In information services it is likely that the reverse will be the case and that access to this market by U.S. firms will be very strictly curtailed or eliminated.

FEDERAL REPUBLIC OF GERMANY

Organization Structure

The Deutsche Bundespost's Legal Mandate

The Deutsche Bundespost (DBP), the PTT of the Federal Republic of Germany was established by the Constitution. The basic rights and duties of the PTT are regulated by law and the DBP practices a strict interpretation of its legal mandate. An understanding of this explains much of this PTT's behavior and policies.

The Constitution of the Federal Republic of Germany, the Basic Law, stipulates that:

--exclusive legislative powers in relation to (postal services and) telecommunications are vested in the Federation;

--the Federation puts the laws into effect through its own federal administration;

--the Deutsche Bundespost is run as a federal administration with its own administrative infrastructure.

In other words, telecommunications are directly controlled by the State. Neither the Lander nor the municipalities, despite the federal structure of the country, have any direct influence or power of intervention. The State's duties in this sphere are performed as part of the State Administration by the Deutsche Bundespost; the latter is headed by the Federal Minister of Posts and Telecommunications, who exercises reponsibility for his department as a member of the Federal Government within the framework of the policy guidelines of the Federal Chancellor.

These constitutional principles have naturally given rise to a series of laws and regulations aimed at protecting and ordering federal telecommunication sovereignty and regulating the use of telecommunications facilities. Where organization is concerned, the most important item of legislation is the Telecommunication Installations Act (Gesetz uber Fernmeldanlagen), which includes the following provisions:

°Sovereignty is the matter of telecommunications (that is the exclusive right to install and operate telecommunication plant) is part of the State's sovereign rights. This sovereignty is vested in the Federation and exercised by the Federal Minister of Posts and Telecommunications (the only exception being federal defense installations).

°The right to set up and to operate individual facilities may be delegated (by authorization).

°No authorization is required, however, in the case of installations used by official bodies solely for internal purposes, or by transport organizations such as the Federal railways for operational purposes, or within a single property or two parts of the same property situated no more than 25 km from each other. In the case of radio installations, authorization is compulsory.

This is the legal basis on which public telecommunication networks are set up and operated by the DBP. The DBP is also responsible for supervising all telecommunication installations subject to authorization (i.e. private installations).

For the performance of its tasks in the field of telecommunications, the DBP is organized on several levels:

- the Federal Ministry of Posts and Telecommunications, as the central governing authority;

- the Central Technical Office for Telecommunications (FTZ), which assists the Ministry with its managerial and executive functions;

- Land post office directorates, plus the Berlin Landespostdirektion, responsible for administration at the regional level;

- telecommunications service and supply offices, responsible for all practical telecommunication duties.

The Federal Ministry of Posts and Telecommunications deals with all questions of fundamental importance. These include policy and economic matters, legislation and the associated implementing regulations, the establishment of conditions and tariffs for the use of telecommunications facilities, international problems, the issue of guidelines and instructions and management, supervision and control functions--relating to both human and material resources-involved in the performance of all other tasks.

As noted above, one of the basic provisions states that the DBP shall have the exclusive right to provide telecommunication services in the Federal Republic of Germany. Exceptions are made only with regard to e.g. the railway and military sector. The DBP is, however, entitled to grant limited rights to other entities or persons for their specific and internal needs.

The PTT is obliged by law to provide all of its service for the general public everywhere in the country on equal conditions, at equal charges and with the same quality. Therefore the PTT is prohibited by law to select its customers according to economic considerations. On the contrary, for a phone call, e.g. over a given distance at a given time, exactly the same rate is to be charged regardless of whether it is established between two big cities or between two small villages. The Deutsche Bundespost believes this has the inevitable consequence that the rates have to be fixed on the basis of average costs and cannot be fixed on the basis of regional or even local costs. A further condition imposed on the PTT by the government is concern for the social aspect of charges for the telephone network. That means monthly recurring charges and local call charges have to be low. The effect is a cross-subsidization between local and long-distance calls in the West German telephone network. As the charges for all other telecommunication networks and services have to be harmonized at least to some extent with those for the telephone network, private cream-skimming must be prohibited under all circumstances. Otherwise the financial basis of the PTT which enables it to comply with the legal and governmental conditions would be destroyed.

West German PTT officials believe strongly that the main purpose of the Deutsche Bundespost's legal mandate is to ensure the provision of services for the population and to create a uniform and modern telecommunications infrastructure in the whole country.

International Standards, Recommendations and National Interpretation

A general goal of the DBP is to maximize common uses networks and uniform communication protocols that are independent of manufacturer and application. The general aim of the PTT is to make so-called open systems accessible to everyone and which permit the users to operate communication systems over the public telecommunications networks of the Deutsche Bundespost with the least possible linkage to manufacturer and application. Such development is only possible, however, when standards set by manufacturers and users no longer hinder the introduction of uniform communication protocols.

Consequently, the Deutsche Bundespost, in conjunction with manufacturers and users, is actively promoting the preparation and further development of telecommunication standards by active participation in the appropriate international bodies, in particular within CCITT.

Notwithstanding, the Deutsche Bundespost recognizes that it is established practice that each Administration is completely free to interpret CCITT Recommendations in a special way for its own country. If, however, a more liberal approach is wanted, it has hitherto been usual to try and change at first the Recommendation and then to introduce the new rules. This procedure has so far been followed by all Administrations, at least where basic principles of the Series D Recommendation were concerned. Resale and shared use are such basic principles.

Telephone Service

Telephony is today, and will remain so in the future, the most important service of the Deutsche Bundespost as far as volume and revenue are concerned. Over the last ten years the number of telephone main stations has more than doubled. In 1970 the number of main stations was just under 9 million, whereas in 1982 more than 23 million were connected to the Deutsche Bundespost network. The demand for main stations peaked in the last two years with approximately 1.7 million a year. These tremendous increases were only possible on account of the telephone having achieved the breakthrough from the business to the private sector.

Whereas only every third private household had a telephone in 1970, roughly 80 percent of the households have one today. For 1985, the DBP expects a penetration rate of approximately 90 percent for private households, which they feel will provide "relative full coverage."

However, as full coverage of private households is approached, the demand for main stations will fall sharply. Current activity already indicates this. This further implies employment problems which are beginning to surface not only at the Deutsche Bundespost but in the telecommunications industry in particular. This accounts in part for the Deutsche Bundespost's efforts to develop and introduce new service offers on the market at the earliest possible date.

Data Transmission

For some years it has been possible to transmit data at high speeds over the Federal Republic of Germany telephone network using the appropriate data circuit-terminating equipment (modems). Since 1975 the public circuit-switched DATEX-network is available for transmission speeds up to 9,600 bit/s and in the last few years extended data communication facilities have been provided by the expansion of networks specially established for this purpose. At present, the following networks are available to handle data traffic:

- the telephone network
- the telex network
- the circuit-switched DATEX network (DATEX-L)
- the packet-switched DATEX network (DATEX-P)
- the EURONET, and
- the public data network for fixed connections.

There are some 111,000 data stations connected to these networks in the Federal Republic of Germany. More than half of these stations are connected to the public data network for fixed connections and approximately a third to the telephone network. There is, however, a tendency to make increasing use of the special data networks. (DATEX-L and DATEX-P).

Data communication is becoming increasingly important in view of the country's economic infrastructure. This is reflected in the high annual rates of growth of over 20 percent. In addition to low-speed parallel data transmission the telephone network offers serial data transmission with bit rates of up to 4.8 kbit/s.

DATEX-L

The line-switched or circuit-switched DATEX-L network, whose operation has been made possible by the Electronic Data Switching System, EDS, was opened in 1975 for telex and data traffic. Today, more than 150,000 telex subscribers are connected to the EDS system besides the data stations. Thus the Deutsche Bundespost operates the largest interconnected telex network in the world. With EDS all the current requirements for asynchronous and synchronous circuit-switched data services with data signalling rates of up to 9.6 kbit/s can be fulfilled. So the DATEX-L network provides also for the carrier function of the telex service.

Shortly, DATEX-L service will be linked to the U.S. Importantly, the DATEX-L network constitutes an integrated telex and data network. This network is capable of extension and open to new applications by the introduction of new features. It is intended to add to the DATEX-L network in such a way that a data signalling rate of 64 kbit/s can be offered to a limited extent in 1983. This will be a model network for initial ISDN experiments. This limited service will allow a certain number of subscribers' wishes for a circuit-switched 64 kbit/s data channel to be met at an early date while the Deutsche Bundespost has the opportunity with this model network to clarify all the questions relating to the standardization of interfaces, the connection of digital private branch exchanges and the charges for integrated services for such different information as speech and data.

DATEX-P

DATEX-P is the DBP's name for their new packet-switched data network. Data terminals from different manufacturers and with different speeds can interwork directly in the DATEX-P network.

The Deutsche Bundespost coordinated the introduction of this new network service with potential subscribers and user organizations in a "Subscriber Working Group" specially set up for this purpose so that any problems arising could be dealt with immediately. Subscribers were not required to pay any charges in the first year of the operation, which ended in late 1981, the object being to gain experience but also to increase the acceptance of this new service.

DATEX-P traffic charges are not based on distance but on the volume of data transmitted. DATEX-P is considered both, a basic and an "added feature network" along the lines of a value added network (VAN). Features to provide protocol conversion and to insure terminal compatibility make this network more than just a transportation service.

International Data Transmission Policies and Services and Leased Channel Services

Customers of the Deutsche Bundespost are offered the following possibilities for data transmission between the service area of the Deutsche Bundespost and the United States (and other countries).

1. The public packet-switched data network Datex-P which is, at present, linked to Telenet, Tymnet, ADP and Autonet in the U.S. and which is accessible from the public telephone network and from the circuit-switched data network of the Federal Republic of Germany;
2. The public telephone network in connection with modems;
3. Direct access to Tymnet via a concentrator in Frankfurt which is accessible for everybody;
4. International point-to-point leased circuits;
5. The combination of international and national "leased circuits" (these are divided here into legally defined classes) as long as the Federal Republic of Germany national "leased circuits" do not have any access from public switched networks;
6. Shortly, via the public circuit-switched data network (DATEX-L) with interfaces according to CCITT recommendations.

Information Processing Policy

Considering all these possibilities, the Deutsche Bundespost has no restrictions with regard to what data are transmitted and where they are processed. However, the possibility to collect data via the public switched networks and transmit them to foreign countries via leased circuits (at flat-rate tariff) is no longer admitted. The DBP claims that this affects only three (3) leased circuits (of about 170 existing circuits) between the United States and the area of the Deutsche Bundespost.

Of course, collection and distribution of data via the public switched networks is still allowed; however, if parts of these data are to be transferred to or from foreign countries via leased circuits, the Deutsche Bundespost demands that the data flow over the border should originate from a real processing procedure which has to be fitted in between the public switched networks and the international leased lines.

Rationale for Restrictions on International Leased Circuit Data Transmission

The restrictions (begun January 1, 1982) on 'combination national/international leased circuits' that access the Federal Republic of Germany public switched networks and which are used for data transmission only is explained by DBP in part, by the availability of new network services.

As long as there was no public switched data network between the service area of the Deutsche Bundespost and the United States, the Deutsche Bundespost agreed to a combined use of national switched networks (telephone and data switched networks) and international leased circuits in accordance with CCITT Recommendation D.1. Thus international leased circuits could be terminated here with a private concentrator which in turn was accessible from the public networks of the Federal Republic of Germany.

With the establishment of the public packet-switched data traffic between the USA and the network of the Deutsche Bundespost (at present, all subscribers of Tymnet, Telenet, ADP and Autonet can be reached from any place in the Federal Republic of Germany), however, it is their view that it is no longer necessary to allow the combination of public switched networks (with usage-dependent tariff) and leased circuits (with flat-rate tariff). This meant at the same time that such a makeshift solution was no longer justified, especially because this is only a permissive provision in CCITT Recommendation D.1 and because the Deutsche Bundespost replaced it by a much better modern technology in the form of the public packet-switched network (DATEX-P). The DATEX-P system completely corresponds to the international CCITT standards and can therefore be used without restrictions by everybody with international standard terminals.

The DBP felt that, given the new network service alternatives and its legal mandate interpretations, it should prohibit access from public switched networks to leased circuits for the purpose of data transmission only. DBP claims that private networks for in-house traffic are and will continue to be possible. The only - but very difficult - problem is to find an international definition for "in-house". As far as networks are concerned which interconnect different users, the Deutsche Bundespost believes they will simply not be allowed in Europe because the public switched networks (circuit switched and packet switched) are in the process of being established just for this purpose. This PTT provides both networks and is about to interconnect them internationally with other similar networks. It is however not possible to establish public networks, which require considerable investments, for the small user only and to allow large users to bypass them. As these new networks are however intended to carry mainly business traffic, the aspect of social policy is not as critical. This means that charges can be fixed in such a way that their structure and their level is much closer to the structure of the cost than in the case of the telephone network. If interconnection of private networks with these public networks proves to be needed--and no need is to be seen so far--, a special charging system for these interconnections will be introduced to compensate for the bypass effect of the private networks.

Attitudes and Policies Toward Additional International Service Carriers

Each new carrier means a new partner for the PTT and thus an increase in costs for a given volume of traffic because of the considerable time needed by DBP to discuss exactly the same subjects with the sixth or seventh partner. So each new carrier will reduce the possibility for lower charges.

The DBP does not have any formal operating agreement with any carrier. US-IRCs are treated in the same way as any other administration where an exchange of letters or even telexes is sufficient to start a service. From DBP's point of view there is not too much competition between the carriers because the FCC has decided that the accounting rate for a given service and route has to be the same for all carriers.

They think that all existing and all new services can be provided, without any difficulty, through the existing IRCs. Therefore they see no need whatsoever to enter into discussions with new competitors on the US scene. They think that telecommunications has to be provided for the public on a reliable and stable basis and that telecommunications services are not suited for open market provision. In principle they see no need to have more than one "carrier" per country. Even with regard to the United States this situation would not be the worst they could think of, although this would be regrettable in view of the long-lasting relations with the existing IRCs.

It is the policy of the DBP to offer only internationally standardized services on international routes. This means that any measure to establish compatibility between standardized services and national US inventions would have to be taken on the US side (and also be paid for on the US side). The DBP would like:

- to have the possibility of discussing tariffs (conditions and charges) with all carriers together and not with only one at a time;
- to leave traffic distribution to the US, that means to have one line only for a given service per country to the US or at least to receive an officially approved formula for the distribution of traffic which could be revised say twice a year;

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- to be safeguarded against a proliferation of the number of carriers because an increase in the number of carriers entails an increase in the cost per traffic unit. 5 (or with ATT 6) carriers are much more than sufficient.

As traffic distribution is a difficult and costly affair, the interconnection decision of FCC is very helpful because it eliminates the need to be connected to every small IRC. This PTT will try to avoid traffic distribution as far as possible, at least for the new data service, because of the cost (of software, circuits and meetings) and the insufficient volume of traffic to be expected in the foreseeable future. Increases in network capacity are only planned according to traffic requirements and not according to the number of carriers.

Attitude and Policy Toward International Resale and Shared Use

A decision by the FCC to allow international resale and shared use beyond the rules of CCITT Rec. D.1 would necessitate severe reactions on the Federal Republic of Germany side, comprising volume-sensitive charges for many applications, considerable surcharges in cases where the volume of traffic cannot be measured, or even cancellation of the service in some cases.

Teletex Service

The Deutsche Bundespost has been a leader in the development of teletex service, demonstrating the system at the 1980 Hanover Fair and playing a key role in the development of international standards for the transmission protocols (achieved November 1980).

Commercial service was introduced in the Federal Republic of Germany in March 1981 initially on a trial basis. International service has been already introduced between the Federal Republic of Germany and Austria (August 1982) and will be opened between the Federal Republic of Germany and

- Teleglobe/CNCP (Canada)
- Western Union WUTCO (USA)
- Italy
- Sweden

in 1983. Several more connections will follow in 1984. The teletex service enables electronic typewriting machines and text processing equipment on a standardized basis to communicate with high speed (2,400 bps).

The DBP believes that the introduction of teletex service will displace existing telex service over a medium and long-term period.

The Deutsche Bundespost expects this new service to reach a high degree of acceptance from customers, acceptance being chiefly dependent on the industry offering inexpensive terminals that are easy to operate and maintain and which can be integrated into office organization with no difficulty. All forecasts made for new services are, of course, highly speculative. From the information to hand on trends in the Federal Republic of Germany the following figures can be derived for the development of terminals:

- some 40,000 in 1987

- some 130,000 in 1992

The DBP believes that teletex service demonstrates the worth of incorporating new features such as protocol conversion in the network so that communication is possible between teletex and telex and hence, between subscribers between these two networks. These new features offer new possibilities for more comprehensive use of the telecommunications networks in addition to the actual transportation of information.

The DBP has an arrangement with Western Union for the provision of international teletex service between the Federal Republic of Germany and the U.S. It is not clear at this time that they will permit multiple carriers for this service.

Equipment and Interconnection Policies

Public telecommunication networks are designed, built and operated by the DBP. A substantial proportion of the construction work is contracted out by the DBP to private firms. All terminal equipment--and its connection to public networks--requires the DBP's approval. All products related to telecommunications are manufactured in the private sector, that is, by the telecommunications industry. All equipment, without exception, is produced in the private sector, chiefly by medium-sized and large firms in the telecommunication industry.

Transmission Facilities/Lines

The DBP acquires the finished product from manufacturers in general on the basis of calls for tenders based on DBP procurement specifications.

Transmission lines are installed by the DBP. It may also employ private enterprises, which are contracted to carry out the work under clearly defined rules (e.g. governing technical and operational requirements, as well as bidding and competition).

Underground work, including laying ground cables, installing cable ducts, manholes and junction boxes and laying cables and pipes across rivers and lakes, is in principle carried out by private firms (mostly small and medium-sized). Also work on the overhead distribution network and to a somewhat lesser extent assembly work on the underground distribution network is generally performed by firms under contract to the Bundespost. On the other hand, transmission lines are operated, i.e. essentially maintained and repaired, almost exclusively by the DBP's own staff. One exception is the maintenance of overhead lines, which is carried out by private firms under contract.

Switching Equipment

The rules in this respect are similar to those governing transmission lines. The DBP buys the equipment from the telecommunication industry. Installation work is shared in varying proportions between contracted private firms and DBP personnel, while the operational side is almost exclusively dealt with by the DBP.

Terminal Equipment

Table 1 shows the situation in the Federal Republic of Germany with regard to the marketing, installation and operation of terminal equipment. A primary instrument policy is in effect with respect to telephone main stations and operation of teleprinters.

Table 1

	DBP[1]			private firms		
	marketing[4]	installation[2]	operation[3]	marketing[4]	installation[2]	operation[3]
telephones - main stations	X	X	X			
telephones - PBX	X	X	X	X	X	X
facsimile	X	X	X	X	X	X
data terminals				X	X	X
car telephones				X	X	X
teleprinters (on the telex network			X	X	X	
radio and television receivers				X	X	X

1. All terminal equipment is purchased by the DBP from manufacturers.
2. Terminal equipment is installed by DBP personnel or by private firms under contract.
3. Maintenance and repair.
4. Sale or hire for single or regular (monthly) charge.

Private Network Authorization and Interconnection

Private networks are permissible subject to DBP authorization. With few exceptions, private telecommunication installations, that is, installations which are not connected to the public network, require the DBP's authorization.

There are also "connection authorizations" for private installations seeking a link with the public network. As seen earlier, restrictions exist in the area of combined use of national and international leased circuits. Generally, the Federal Republic of Germany follows the D-series recommendations with regard to private-public network interconnection.

Type Approval

Type-approval is required for practically all types of equipment, used in or connected to the public telecommunication network.

While authorizations are concerned with the connection and operation of installations of various kinds, approvals apply to equipment only. Approvals may be general (e.g. covering series of items) or individual, for a particular device.

The approval certificate confirms that, if connected to DBP installations, the equipment cannot produce any harmful or troublesome effects on public networks or impair their operating quality and that it complies with the relevant DBP technical specifications.

The Central Technical Office for Telecommunications, the Fernmeldetechnisches Zentralamt (FTZ), is responsible for planning large-scale or new technical installations, for all matters connected with standardization and patents and for work related to the approval of equipment. Inside the overall "approvals" group, the latter work is at present being concentrated in a new administrative unit, the central office for telecommunications approvals, which will be independent (akin to a directorate), and will cover the whole field on a centralized basis.

Future Competitive Access

The DBP is not planning to make any radical changes in the organization of telecommunications in the Federal Republic of Germany in the foreseeable future. In the longer term, the DBP believes that any organizational changes should be introduced within the framework and limits of the following principles.

1. its own monopoly-type position with respect to public networks and ordinary telephone main stations;
2. its share in the terminal equipment market;
3. its realistically administered right to authorize private telecommunication installations;

4. its liberal approval procedure with respect to terminal equipment, and

5. the monopoly of the private sector in the manufacture of telecommunication products.

Consequently, it is anticipated that most, if not all, public telecommunication services will remain a monopoly of the DBP while terminal equipment will remain subject to competitive access. The outlook for the Federal Republic of Germany is, essentially, one of status quo. No greater competitive access is expected beyond that liberalization which has already been long-standing policy in the equipment sector.

Any overhaul of service policies and provisioning will have to arise from forces external to DBP. We understand that there has been some limited investigation into alternative structures but no firm proposals have surfaced. It could be that the occasion of a more conservative government could lead to alternative views and pressures for change. However, even such a development would take several years before any substantive structural change, if any, is erected.

FRANCE

The French telecommunications network is cast in the traditional European mold. All service is provided by the Ministry of Posts and Telecommunications (PTT).

Responsibility for French telecommunication needs, matters and policies rests with the Direction Generale des Telecommunications (DGT), the telecom branch of the French PTT (Postes, Telecommunications, et Telediffusion). DGT responsibilities include:

1. Identify the needs of the French telecommunication system and provide the appropriate facilities, networks and services:
2. Determine technical standards;
3. Establish policies, both domestic and international;
4. Provide technical assistance to foreign countries;
5. Perform research and development (through CNET--the French equivalent of Bell Labs).

The DGT's Direction of Industrial and International Affairs (DAII) establishes policies with regard to equipment attachment, industrial strategies and international service agreements. CNET (Centre National d'Etudes de Telecommunications) is responsible for technical standards, testing and type-approval of equipment.

The PTT operates the telephone network and buys its products from various suppliers. The policy is to have at least two suppliers per type of equipment (switching, transmission, etc.) These suppliers are selected following a call for bids. Today, the major suppliers are CIT-Alcatel (part of the CGE - Campagnie Generale d'Electricite Group) and Thomson-CSF. These national firms supply most of the French PTT's requirements.

The French government has spent vast sums of money in the past eight years to modernize the French telecommunications network. Espenditures over that period have run between $4 and $5 billion per year (versus $13 billion by AT&T). Spending will continue at that level over at least the next three years. The aim of these expenditures is to continue to install a nationwide integrated digital network (IDN) with the completion of a 100% digital connexity by 1984. This is possible because of the high concentration of digital central offices and the existence of digital transmission trunks. Already the public network provides both circuit and packet switched data services. These services will be migrated during the 1980's.

The development of teledata and new telematic services raises complex problems in the definition of networks and facilities and distinguishing between the network and the service.

The French approach entails using existing networks, with additional facilities and capabilities as necessary, providing new networks or media to meet demand not covered by existing facilities, and above all, defining a policy governing the interworking of the networks and segregating the network from the "programmes."

In France, the public telephone network subtends the entire future structure and will be the more basic to the policy once it has become fully electronic, within about ten years, but still including equipments specifically designed for particular traffic flows.

This process will lead France from the present system of networks to a single integrated service digital network of nationwide coverage, somewhere in the future.

The French Telecommunications "Regime"

The legal principles that undergird French telecommunications policy make a distinction between legal monopoly and centralized authority. This is to say that the state does not have a legal monopoly on telecommunications. The basic principles provide that no telecommunication equipment can be installed or used except by the Minister's authorization. This means that the telecommunications activity is not reserved for the state, unlike the postal service which is fully reserved for the state, but the Minister has the right to authorize any kind of telecommunications equipment in the country. To the pragmatist, this distinction may seem moot. To the French, it is a distinction of cherished tradition. To the realist, there is a valid difference between a monopoly created by law and a monopoly administered by the State.

There is, at least, less absolutism in the latter instance. Consequently, one does find pockets of openness in the French regime.

This authorization power is subject to non-discriminatory and neutrality rules. The former rule insures that all users are equally treated and that authorization is not given to one user and refused under the same conditions to another. The neutrality principle guarantees the neutrality of public service.

That is, the telecommunications authority does not control the content of the communications. This, too, is not a moot point but a critical distinction, recognized in Sweden also. This principle exerts itself in now telematique services such as Videotex in which the French draw a distinction between the network and the "programmes" as we shall see.

Another principle or rule considered an important basis of the French telecommunications "regime" and considered a check on the central authority power is a guarantee of the permanence of the service. During the last fifty years, even in the most difficult and toughest social conflicts in France, the permanence of the network has never been attacked and the unions have never switched off the network.

These 'rules of the regime' have established a telecommunications philosophy and basis that is considered flexible because the Minister can give or refuse authorization but, on the other hand, is not a completely monopolistic activity. Indeed, the French authorities believe that they have already made quite a liberal use of this power in allowing private networks; a competitive terminal equipment market; and, presently, recognizing the private rights and initiatives of information providers.

The scope of state-controlled monopoly in France is quite different according to whether it deals with the network or with the terminal equipment and whether it deals with the network or the programs (content). The networks are a monopoly of the state, or a subsidiary of the state as in the case of Transpac, the packet switched network. Terminal equipment is open to competitive supply and has been so liberalized since 1920. Thus, the French point out that this is not a recent deregulation move but a situation that has been liberalized for over fifty years.

With respect to new telematic and information services, such as Videotex, the French telecommunication authority can be expected to make a distinction between the responsibility of the networks, in which telecommunications is to be the master and the responsibility of the programs and their content, in which maximum reliance will be placed on private initiative and regulated, not by the telecommunications systems and authority, but by the general public laws on information.

No major changes to the present institutional situation in France are expected. The basis and principle of network monopoly will be reaffirmed. Terminal equipment will continue to be open, subject to PTT approval. Information providers, considered outside the province of the network, will not be regulated by the Telecommunications Ministry. The particular mix of monopoly and private initiative that has characterized the French telecommunication regime will continue in roughly the same proportion.

Monopoly control of telecommunication networks will not be relaxed. That is, no further liberalization of French telecommunications activities are expected save the abovementioned forebearance of regulation (by telecom authorities, anyway) of new electronic information providers.

Services Policy

All services are provided by the PTT or a subsidiary of the public administration. Currently, private line services are available for point-to-point unswitched services but it is intended that these will become unneeded as the public network migrates to an ISDN.

The public telephone network has been, for several years now, undergoing major expansion. This will continue during the 1980s growing from 15,000,000 lines mid-1980 to about 30,000,000 by 1990. The ubiquity and size of the public telephone network figures prominently in all French service developments and policies.

France is, at present, in a large-scale installation phase of time division equipment. Currently, they are ordering only electronic equipment, most of them (85%) time division. By the end of 1981 more than 2 million time division lines were in operation and in 1983, it will be more than 7 million, which is to say more than one-third of the total number of lines at this time.

The French hope to attain complete digitization of the local networks in the early 1990s.

From 1984, the penetration rate of the time division switching will be such as most of the local areas will have at least one time division switching system. At the same time, the network digitization allows an entirely digital path between two time division exchanges. Thus it is possible to supply the subscribers asking for it a nationwide 64 Kbit/s switched link. Thus, the integrated digital network (IDN) will be possible from 1984.

The possibilities of new services are then highly increased as the voice, the data, the teleconference, the 64 Kbit/s quick facsimile, and so on, are available to any telephone subscriber with the flexibility of use of the telephone network.

In the same way, the added value might be introduced in the network to offer services such as text and data processing and transmission or voice boxes (Phonex).

Once established, the integrated digital network becomes an underlying base for the development of the RNIS which will be gradually introduced with the establishment of common channel signalling and the extension of the subscribers connecting units with capability to process the new services.

France does not distinguish between basic and value-added functions as a basis for allowing competitive firms to provide the value-added service. They do make a distinction for the purpose of network planning and network interworking or interpenetration, as it is sometimes called. The key is whether its part of the "network" versus some activity that may be considered external to the network. If it is part of the network, it is the province of the PTT monopoly, period. Thus, the only justification for a basic-enhanced service dichotomy in France would be for operational and tariffing reasons, not for allowing competitive entry of other service providers.

Data Communications

The data transmission facilities and services currently available in France from the PTT are:

1. transmission through the line-switched public telephone network at up to 2,400 bit/s, in half-duplex, and on higher quality leased channels at up to 9,600 bits/s;

2. slow data transmission on the telex network (at 200 bauds, after call set-up procedures at 50 bauds);

3. the CAUDUCEE analog four-wire circuit-switching network;

4. the Group-band Data Transmission service;

5. the TRANSPAC data-packet switching network;

6. the new TRANSMIC leased digital channel service, offering bit rates of 2.4 kbits/s to 2,048 Mbits/s, but at present limited to certain areas of the country.

The expansion of data transmission networks will be substantial. New telematic services (Teletex, Videotex, Telecopy) will create new forms of demand, satisfied either by adding new facilities to existing networks, or by providing complete new networks such as the already planned TELECOM 1 interlocation satellite network for industry.

There are also plans for the development of a store-and-forward service interfacing with several networks. Value-added functions will be added to various network services of the PTT. These networks will interwork according to, as yet, an unexact PTT policy. The public telephone network will be an integral part of this scheme. Ultimately, this will evolve to an integrated services digital network.

Transpac

Specified between 1973 and 1975, Transpac was at that time essentially intended for the business teledata market, with the specific aims of supplying service to a wide range of users at substantially better prices than leased line service, and using techniques much better suited to their needs than those of the telephone network.

Initiated in 1978, officials believe that Transpac will take over most of the business data traffic which dedicated networks now handle.

Since its initiation at the end of 1978, the Transpac Network has been very successful, numbering 8,500 subscribers at the end of 1982. Two thirds of the connections use X.25 access, which means that Transpac is today the largest X.25-based user network in the world. It handles a total traffic of 100 billion characters per month. The speed of transmission between two nodes is 72 kbps. For the user, the maximum speed is 1200 bps with dial-up access and from 2.4 kbps to 48 kbps through the use of a dedicated access line.

It has been decided to launch a second generation of equipment in 1983 based on the DPS 25 technology. Transpac service was designed to suit the market sector initially aimed at business or professional teledata, which puts in calls in the terminal-to-computer or computer-to-computer direction. It is now also used for transmission of telematics services (videotex, teletext, facsimile).

Transmic

The first step, in France, towards absorbing the latent demand of potential users requiring bit rates of over 64 kbits/s, was the introduction of Transmic at 2.4 k to 2 Mbits/s.

However, extension of the service's coverage, and above all rapid extension to nation-wide coverage, are impeded by the present limited capabilities of the telephone network. Also, digitizing long-line service, even at a rapid rate, will take up the rest of the decade, and it will take even longer to digitize all subscriber loops.

Transmic is a point-to-point system, lacking in flexibility insofar as dynamic channel allocation and switching are concerned. Its channels are seldom as fully used as the fixed subscription would demand. These limitations have stimulated the development of digital satellite systems, namely Telecom 1.

Telecom 1

Communication by satellite, and more precisely with TDMA, has none of these weaknesses, offering a packet solution for all the inter-branch communication problems of large corporations.

These reasons and much wider considerations of industrial strategy resulted in the French government's decision to create an industrial inter-location satellite communications system by 1984, Telecom 1. Telecom 1 represents the first multiservices network in France.

Telecom 1 will have a transmission capacity of 120 Mbits/s, with on-demand allocation and practically instantaneous reconfiguration capabilities.

The system is classically composed of a space segment (the satellite and TDMA ground stations), and a connection net between user terminals and the space segment.

The land connection system is designed to concentrate traffic before access to the space segment, and to offer user terminals standard trunks of high data quality. This concept guarantees multipurpose system availability for all types of application, and a service life beyond that of the satellite.

The basic services offered by Telecom 1 are those envisaged for the future service-integrated digital network, namely the availability of transparent data and digital telephone circuits, based on the CEPT standardized 64 kbits/s circuit and its multiples up to 2 Mbits/s.

Several basic facilities are to be provided, such as hot-line connections, abbreviated numbering, call charge reversing, closed user groups, etc., and a number of special facilities are planned or under consideration, signalling for telephony, voice and picture transmission (videophone), interfacing with store-and-forward service, user assistance service, etc.

Telecom 1 is intended to supply existing demand, which is telephone and teledata communication of the conventional type, and to open the way for development of new applications, prevented or hindered at the moment by the absence of adequate midia-video-conference, new teledata applications, such as file and program transfers, high capacity electronic mail, press facsimile, still and live video, etc.

Telecom 1, incidentally, will be part of the space segment for Europe's new business satellite services.

New Services and Policy

With respect to new services and new technologies, the policy will be to reaffirm the PTT monopoly with respect to the network and public gateways (and, at times, the terminals) and rely on the private sector for the information-oriented services. Where it's primarily a telecommunication service as with Teletex or Telecopy, the French PTT will provide all the functions. In services such as Videotex, certain functions are reserved for the private sector.

Videotex

The first application of this principle is evident in the French Videotex system. The PTT will assume responsibility for the network, public gateways and terminals but agree that the actual data bases, the service, will remain under private control. Pursuant to this philosophy, the PTT opened a network which will give access to the electronic directory service through the Transpac Network using the videotex terminal provided by the PTT. This, they consider providing the gateway. It will be left to private initiative to provide the services which encompass data bases, banking services, editing services, information services, sales order company services and the like.

France carries out a number of field trial experiments to know the interest of the private or public user for these new services.

- In the field of videotex, the experiment of the Teletel service was opened July 1981. It involves 2,500 subscribers of the suburb of Paris (Velizy - Versailles) and tests their reactions to the numerous services ranging from the simple information retrieval to the most elaborated interactive games and educational programs.

- In the same way, another videotex service, the electronic directory started in the western part of France and now involves 250,000 subscribers.

Broadband/Fiber-Optics

The rule the PTT has established for videotex is expected to apply also for the fiber-optic cable networks. The technology will be considered the province of the network which means the province of the PTT. As one PTT official put it recently:

> ..."I really think that we must not commit the mistake of letting the networks for broad-band transmission be built separately from the telephone network. It would be an economical mistake. Why should we destroy the streets in the cities to put new cables when we have some room available for fiber-optics in the telecommunications channels? We have the men who know how to lay these cables, and we also have the investment capacity to lay the cables. Provided the distinction is made clearly between the network and the programs, I see only advantages in reaffirming the monopoly on the networks and granting telecommunications the responsibility of building these networks."*

Message Handling Service

If a message is defined as a unit of information complete in itself, such as a banking transaction, a letter, a bill, etc., it is immediately understood that it can be transmitted in real time through a telecommunications network of the line-switched type, such as the telephone network, telex, Telecom 1, etc. It may also be transmitted through a packet-switching network, such as Transpac.

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*Henrot, M. Francois, "The Future Role of the State Monopolies--France," speech to a Financial Times Conference.

However, once the structure of the message is sharply defined, as to length, etc., it can also be stored in an electronic memory and forwarded at some later time. This is the basis of a new store-and-forward or message handling service.

This store-and-forward service may be considered of value essentially because of the added facilities it offers the users. These facilities include:

1. deferred delivery;
2. multi-address forwarding; and
3. code and protocol and speed conversion between various terminal types.

The French see the conversion to suit different standards as quite different from that done by a packet-switching network, which is essentially concerned with transmission procedures, or low-level protocols. In this case the protocols are high-level, or virtual machine protocols, to adopt the terminology sketched out by the ISO and CCITT in their work on the definition of layered architecture. In their view, this store-and-forward service is not to replace real time services but to assist and improve them. In other words, what is considered is the provision of message switching nodes, accessible from various existing networks or those planned (telephone, Telex, Transpac, Telecom 1, etc.), rather than a full-blown store-and-forward network in itself.

Message switching services exist already, or are being created, to fill specific gaps in the world market: national and international telegrams, touristic teledata, seat and accommodation reservations, bank message forwarding (mainly compensation transfers between banks) and the Simplexcom commercial document transmission service.

The French anticipate that the added value of message handling services backing up real time services will assist greatly in developing electronic mail, particularly wherever adaptation between the various alphanumerical text communication services is needed. Consequently, France's Message Handling Service will be applied to electronic mail, in its various forms: Telex, Teletex, Telecopy, and even Videotex.

Leased Circuits

Private networks are allowed, using leased lines, as long as they are used only for the user's internal data or voice traffic.

The private network user can use either private switching equipment or a public switching service for leased lines called "Colisee."

Resale and Shared Use

Resale and shared use policies are in accordance with CCITT D-Series Recommendations.

Equipment and Interconnection Policy

The terminal equipment market is open to competition and has been since it was liberalized in 1920. Users may select basic equipment from private manufacturers or from the PTT.

For residential services, the telephone sets, the answering machines, etc., can either be rented from the PTT or bought from the private sector. As two-thirds of the private subscribers are equipped with plug-in sockets, they can make very large use of this liberty.

Regarding specialized terminals, the situation is the same as in the Federal Republic of Germany. The terminals, like facsimiles or teletypes, are fully provided by the private sector, and the more specialized terminals, like teleprinters, are provided either by the PTT or by private manufacturers.

Looking to the private exchange, the PTT has limited the scope of its action to a very small capacity private exchange, with twenty extension lines. For the middle and large capacity, PABX, the user - the private companies or public authorities - can either rent or buy the equipment from private manufacturers. Users can also arrange for maintenance service directly from private companies. This service sector of private companies in France which rent and maintain the PABX has more than 15,000 jobs and realizes around 1.5 billion francs turnover per year. This is one of the original characteristics of telecommunications in France. Recently, M. MEXANDEAU, who is in charge of the PTT Ministry in France, publicly stated that this situation, which is a product of history and puts France in quite a liberal position in Europe, will not be changed.

On the other hand, the PTT has opted to provide a small videotex terminal to subscribers at the rate of $10.00 per month even though they will rely on the private sector for the services. This seems to be at variance with the long-standing terminal liberalization policy. This apparent divergence is not clear, at this time.

Type Approval

Two main conditions are set for the installation of terminal equipment in France. First, all the equipment must be approved by telecommunications public laboratories before marketed and used. Secondly, for the more sophisticated terminal equipment, like PABX, the connection to the public network has to be approved by the administration in order to check that the technical requirements of the connections are fulfilled.

Information Processing Services Policy

The government of France has a quite well-developed information processing services policy. Generally, this calls for the encouragement of the development of a French industry through such activities as the subsidization of R&D, nationalization and, at times, tariff and non-tariff import restrictions. The overall impact of these policies have been to discourage new entry into the French information processing services by non-French firms. The aim of this policy is first and foremost to assure the creation and continued health of an information industry in France. A secondary goal is to protect employment in the French information processing industry.

France, under both the former and current governments, has accordingly been encouraging the development of both the infrastructure (in telecommunications and manufacturing) and ability (in technology and personnel) to develop an information service sector which is French controlled.

Some circles within the new socialist government also would like to see increased government ownership of firms in the electronics and information processing industries. Indeed, some nationalization has taken place during the last couple of years. This belief is not shared by all, however. Others see a continued reliance on the private sector for information services. This includes room for foreign service providers. Still others favor promotion of French industry.

Consequently, there are internal national tensions in France that suggest, on the one hand, less market access for U.S. firms while, on the other, suggest status quo, at least, for U.S. firms already serving the market.

Nonetheless, the information services market is relatively open and U.S. firms do participate in it. Present policies in France emphasize the promotion of U.S. use and access of French data bases, etc. French PTT officials say this is not to restrict U.S. providers in France but to increase the flow the other way, too, and thereby, increase total traffic which is in their interest.

Competitive Access

The prospects of greater competitive access to French markets for services or equipment are mixed. The concepts of greater foreign competitive access to French telecommunication and information service markets conflict with certain policy tendencies or directions of the French PTT or the French Government. Network facilities and telecommunication services will remain a PTT monopoly and emphasis will be placed on French industry. Information services (encompassing time sharing, Videotex, electronic mail, etc.) will be subject to competitive business services. Although the PTT may also provide certain of these services in competition, they are not considered part of the PTT monopoly. U.S. firms will find market access relatively unrestricted for some services and preempted for others. Often, they will find it necessary to work jointly with French firms.

The terminal equipment market is already open and this situation will remain the same. However, there is strong preference for French suppliers and expanded market access by U.S. firms, though theoretically possible, is not forecast. Indeed, some U.S. firms have been restricted or exited the market due to French nationalization policies. In any event, U.S. firms should have a business agreement with a French company in order to have market access.

HONG KONG

Hong Kong was one of the first cities in the Far East to realize the advantages of telephonic communication when a public telephone system was installed in 1882, just six years after invention of the telephone.

The decade commencing in 1965 witnessed a period of rapid growth for the system when the number of telephones rose from 250,000 in 1965 to reach the million mark in 1975. By December 1981, there were almost two million telephones served by 1.4 million lines, giving Hong Kong the highest telephone density in South-east Asia with more than 35 telephones per 100 population.

Hong Kong is a very small area with a total population of 5 million. Although in principle, competition is seen as a healthy business practice, the very small market and the consequent lack of volume on which to base competitive services, is seen to be lacking.

Organization Structure

Telecommunications in Hong Kong is governed by the Telecommunication Ordinance and the Telephone Ordinance which form part of the Laws of Hong Kong. An important provision of the Telecommunication Ordinance is that no person should establish or maintain a means of telecommunication within Hong Kong without a license.

Hong Kong Post Office

The Postmaster General is the Telecommunications Authority in Hong Kong and administers the Telecommunications Ordinance, which governs the establishment and operation of telecommunications services. He is also responsible for ensuring that a satisfactory local telephone service is provided under the provisions of the Telephone Ordinance.

The local telephone service is operated as a public franchise by the Hong Kong Telephone Company Ltd. under the Telephone Ordinance while international telecommunications services are provided by Cable and Wireless (Hong Kong) Ltd. under a license issued within the provisions of the Telecommunications Ordinance.

Telecommunications Board

The board is responsible for advising the Governor on all matters affecting the operation of internal and external telecommunications services in Hong Kong, and on the measures necessary to ensure the continued operation of services in any emergency.

Telecommunications Branch

The Telecommunications Branch of the Post Office ensures that the provisions of the Telecommunications and Telephone Ordinances are observed in the operation of radiocommunications and telecommunications within Hong Kong. It also acts as an advisor to government on all types of telecommunications services. The functions of the branch include:*

1. Monitoring franchised company performance for ensuring that the franchised companies provide satsifactory telecommunications services within the provisions of the controlling legislation. The work includes the study and assessment of the operations of the services of the franchise companies, including operational statistics, tariffs and service performance. Advice is provided to government on matters concerning the provision of public telecommunications services.

2. Telecommunications systems planning for planning and co-ordinating the implementation of telecommunications systems and radio systems for government and for coordinating the use of radio sites.

Under the terms of a lease signed in 1938, all public telecommunications services in Hong Kong are provided by Cable & Wireless (HK) Ltd. and the Hong Kong Telephone Co. Ltd.

Service Policies

There are two major providers of telecommunications services in Hong Kong; these being Hong Kong Telephone Company Ltd. and Cable & Wireless (HK) Ltd. Hong Kong Telephone Company is a local public company whose shares are quoted on the stock exchange. Cable & Wireless, on the other hand, is a locally registered company which is owned 80% by Cable & Wireless PLC and 20% by the Hong Kong Government.** The basic telecommunications services, i.e., telephone, telex and telegram are operated by these companies under an exclusive franchise from Government. Theoretically, other telecommunications services may be operated in competition so long as the service has been duly licensed. However, these prospects are limited due to the exclusive franchises.

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*Other functions include radio frequency and spectrum management.

**This past year the Hong Kong government bought back 20% of the Cable and Wireless franchise - but left the service monopoly in C&W hands.

Cable & Wireless (HK) has an exclusive right to operate all circuits for the provision of external public telecommunications services, external leased circuits, external public telephone services, external and internal telegram service, external and internal telex and certain other minor services. Hong Kong Telephone Company (HKTC) has an exclusive right to provide the public telephone service in Hong Kong.

Services outside of these exclusive rights, e.g. data transmission, may be operated by either company or any other company to whom a license has been granted. As far as can be determined, no other company has been so licensed.

Domestic telephone services are provided by the HKTC monopoly who interconnect with C&W for the joint provision of the international telephone service. There are, of course, no long distance services. Local services in Hong Kong's major population centers of Kowloon and Victoria are quite good. Business services are adequate and new digital services are to be introduced in the near future.

Hong Kong Telephone Co., Ltd.

Telephone service today is provided by Hong Kong Telephone Company Limited, a public company operating under franchise from the Hong Kong Government.

The company derives the majority of its income from charges for installation and rental of telephones, related ancillary equipment and other telephone services.

At the end of 1981, staff establishment stood at 12,000 with more than 85 percent of the staff working in the engineering disciplines of the company. Hong Kong Telephone is governed by a board of directors comprising 10 members, one of whom is appointed by the government.

Telephone Service

Telephone service is readily available and allows for an unlimited number of calls within Hong Kong on payment of a modest monthly rental charge.

Hong Kong Telephone offers both the residential and the business customer a wide range of facilities from basic telephone service to computerized business systems and special equipment designed to meet individual requirements. The company also provides data transmission services, a full range of teleprinter facilities, a telephone paging service, a Time and Temperature Announcement service and local or international conference call facilities.

The volume of international calls made from Hong Kong continues to show dramatic annual increases which reflect the growing importance of efficient telecommunications to this major international trading center. During 1969, the number of international calls was only 572,000 but this had grown to more than 5 million in 1979 and exceeded 9 million calls in 1981. The International Direct Dialling (IDD) service which allows subscribers to dial direct to more than 80 countries was introduced in 1976. This popular service offers an international telephone service at a cheaper rate than operator-assisted calls and currently handles about 70 percent of outgoing international traffic. Other calls are routed via the company's two major international operator service centers.

The company recently undertook a development phase for the introduction of Viewdata and plans to introduce many other new facilities including mobile radio telephones and an expanded range of telecommunications equipment and services.

International Service--Cable & Wireless (HK)

International services are provided by Cable & Wireless (Hong Kong) under an exclusive franchise, as noted above.

The Cable and Wireless subsidiary in Hong Kong is supervised by the Crown government in the form of the Telecommunications Board, but generally is licensed as Hong Kong's exclusive international operator and correspondent.

The current franchise does not expire until 2006 - nine years after the termination of Britain's lease in Hong Kong. Accordingly, Cable and Wireless has been working out arrangements with the Chinese government and has recently entered into a number of joint venture arrangements with the Chinese.

It is important to distinguish between the activities of Cable & Wireless (HK) Ltd [illegible] the other parts of their organization such as the parent company Cable & Wireless PLC and Cable & Wireless Systems. Although related they are separate concerns with different objectives and roles. It is Cable & Wireless PLC and not Cable & Wireless (HK) Ltd that has recently been involved with China in joint development projects. Cable & Wireless Systems, based in Hong Kong, offers telecommunications system, equipment and consultancy in South-East Asia. It does not operate any public services.

International services available include public telegram, telex, telephone, television programmes transmission/reception, leased telegraph and voice circuits for private communication networks, public facsimile (Bureaufax), public switched data, International Database Access Service, ship-shore and air-ground communication. In addition, Cable & Wireless (HK) also operates the local telex and public telegram services.

Cable and Wireless (HK) offers a wide range of services, from the basic public telegram to advanced high-speed data communication.

The company provides international leased voice, data and telegraph circuits for private communication networks, ship-shore and air-ground communication facilities, international television program transmission/reception, international and internal telex and the international telephone service.

International telephone service is provided jointly with the Hong Kong Telephone Company Limited. Cable and Wireless (HK) is responsible for international arrangements and the telephone company for internal switching. The International Telephone Switching Center at Cable & Wireless (HK) has been expanded in several stages. It is now handling 160,000 call attempts per day. An additional international telephone exchange is planned for Hermes House. The first phase of this project is scheduled to be completed in 1983.

Public Data Services

Cable and Wireless (HK) offers two public data services: International Public Switched Data (IPSD), and International Database Access Service (IDAS).

IPSD enables subscribers to make international data calls over the public switched telephone network to any suitably equipped subscribers in countries where the service is permitted.

The IDAS service is provided over the international public packet switched data network and allows subscribers in Hong Kong to communicate with computer-based information systems in other countries. The service is now available to the United States, Canada, Great Britain and Switzerland.

Considerable development work is in progress to expand the range of services over the international public packet switched data network, as well as to increase the number of destinations.

Another data service is Bureaufax which enables the general public to telecopy documents, graphs, drawings or handwritten material overseas. At present the service is available to 27 destinations including the United Kingdom, the USA and Japan.

IFAX (International Facsimile Service) is available to customers who have their own facsimile terminals and who wish to exchange document information with correspondents in other countries.

Cable & Wireless (HK) also provides studio facilities for the transmission and reception of international TV programs via satellite and other specialized services.*

In 1981 Cable & Wireles (HK) handled an estimated 30.7 million minutes of outward telex, 57.8 million minutes of outward telephone traffic, and 1.5 million outward public telegrams.

Leased Circuits

International leased circuits were introduced in Hong Kong in 1954 and have grown steadily with some 1,700 circuits leased by 38 private network users.

Private communications networks are established by leasing circuits to interconnect the overseas offices of companies that operate internationally.

Private networks can be engineered to carry telegraph, data, facsimile and voice transmissions depending on the customer's needs.

For customers who require switching facilities Cable and Wireless (HK) provides a computerized Message Switching Center (MSC) for telegraph applications, and an Alternate Voice Data (AVD) switchboard is available for private network voice and data switching. Both switches are manned technically and operationally on a 24-hour per day basis.

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*Cable & Wireless (HK) operates the Hong Kong Coast Station which provides ship-shore telephone, telex and telegram services, as well as air-ground communication for airline operators.

The MSC was introduced in 1969 to serve some of the larger leased circuit subscribers. The MSC has expanded rapidly to become the largest "real time" switching center in Asia and the Far East, handling over five million messages per month at a peak output rate of 38,000 messages an hour.

Telex Service

Telex was introduced in 1959 to 18 subscribers in Hong Kong on a manual system with operator assistance. Installation of Hong Kong's first computer-based automatic telex switching facilities was completed in 1972, enabling subscriber dialling. This was followed by several phases of expansion, in 1974, 1977 and 1979, increasing the capacity to handle the present 16,858 subscribers and to meet growing demands. Further expansion of telex switching facilities is being carried out in Hermes House, the company's new telecommunications center in Kowloon, where installation of the Kowloon Telex Exchange will soon be completed.

Telex is handled by two computerized fully-automatic combined subscriber/trunk exchanges manufactured by Hasler AG of Switzerland. Each of the two exchanges that are now in service has a capacity of 32,000 line terminations. The majority of these are used for subscriber connections and the remainder for international trunks, inter-exchange junctions and other service requirements.

Subscriber facilities include store and forward (Startex), automatic advice of duration, time of delivery, multi-address and conference calls, abbreviated dialling, call re-direction, common number group and automatic/manual enquiries. Both domestic and international telex service is provided by Cable & Wireless (HK).

Equipment Policy

In terms of provision of exchange equipment and line plant HKTC and C&W(HK) go out to international tender. Recent important contracts have been awarded to firms in Japan, Sweden and Switzerland.

Telecommunications terminal equipment is provided on a competitive basis but requires a permission to connect in respect of each type of equipment. Most equipment is, however, carrier provided for reasons such as the following.

C&W(HK) provides a wide choice of equipment which it, in turn, procures from suppliers throughout the world, a large percentage coming from the USA. There is limited direct interconnection of customer owned equipment as most customers prefer to take the complete C&W service package which includes provision and maintenance of equipment.

Information Processing Policy

There are absolutely no restrictions on information services.

Future Competitive Access

Domestic services are expected to remain the exclusive franchise of Hong Kong Telephone Co. Cable & Wireless provides all international services and it is unlikely that any competitive services would be allowed. It is unlikely that there will be expanded competitive access for telecommunications service providers, although Cable and Wireless may negotiate new interconnection agreements for a larger share of the profits.

The prospect of continued and even expanded access for information service providers appears excellent.

ITALY

Organization Structure

The control, structure and operation of telecommunications in Italy is a truly unique conglomeration of government organizations and private or quasi-private concessionaires.

Service responsibility is divided between the Ministry, Posts and Telecommunications (MPT) and the STET* Group of quasi-private companies. Overall policy, regulation and supervisory control is exercised by the MPT. The STET Group is ≈65% owned by IRI,** the Italian agency for participation in and supervision of government controlled activities.

The mixed private-public formula used in the Italian System is seen to yield benefits in terms of:

1. Balancing private and public interests and the economic and political needs; and
2. Attracting private capital through share ownership (there are over 45,000 stockholders of STET shares).

Given present conditions and a propensity for the existing mixed private-public system, there is little chance that the Italians will evolve to an open competition system analogous to that in the U.S.

An overview of the Italian system is useful since telecommunications services are provided in a manner which differs from most other European nations.

IRI

The involvement of the Italian Government in the field of telecommunications operations goes back amost 50 years (to 1933) when IRI established STET as the holding company for telecommunications, taking over the concessionary telephone companies then in operation in central and northern Italy. At that time, national telephone service was provided under the authority of franchises granted by MPT.

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*Societa Finanziaria Telefonica p.a.

**Institute for Industrial Reconstruction

IRI (Institute for Industrial Reconstruction) is the national control agency established in 1933 with jurisdiction over government-controlled activities including banking, utilities, telecommunications, electronics, transportation, construction, and other industries.

In October, 1933, IRI formed the Societa Finanziaria Telefonica p.a. (STET), assigning to it the task of operating, controlling, and coordinating these companies. In 1958, the other two private companies (TETI and SET) were incorporated into the STET Group and in 1964 all five companies were merged into SIP which became the only concessionary company providing domestic telephone service.

The formation of Telespazio in October 1961 (for satellite communications responsibility) under STET auspices and incorporation of Italcable within the STET Group in October 1965, gave the State direct control over the management of all public telephone services.

Divided Service Responsibility

Telecommunications activities in Italy are, in general, supervised by the Ministry of Posts and Telecommunications.* The Ministry, in turn, has an autonomous public corporation-Azienda di Stato per i Servizi Telefonici (ASST)-which is responsible for planning, building, and operating the primary Italian telephone network, with central control in Rome. ASST provides the international telephone service with the Mediterranean and European countries and the long-distance service between the main cities in Italy.

Telegraph services within Italy are provided by the Direzione Centrale Servizi Telegrafici, a department of the Ministry, which also supplies national and European telex service. The main international exchanges are in Rome and Milan.

Presently there exist six companies which, through concessions, provide telecommunications services:

1. RAI - Radiotelevizione Italiana--through its own studios, microwave links, transmitter, and relays provides two TV programs and three sound programs.
2. SIP (IRI-STET)--plans, installs, operates, and maintains the local telephone networks, and some inter-city links.

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*The primary focus of responsibility for telecommunications policy-making rests on the PTT, under the supervision of the Government and the control of the Parliament.

3. Italcable (IRI-STET)--provides public intercontinental services such as telex, telegraphy, telephony, data transmission, etc.

4. Telespazio (IRI-STET)--operates the Italian satellite earth stations in Fucino and Lario which provide Intelsat services and environmental data acquisition from LANDSAT.

5. Radiostampa (IRI-STET)--provides press telecommunications services both nationally via a social telegraph network and internationally via Italcable.

6. SIRM/Telemar--operate radio ship-board stations for the Merchant Marine.

Under authority of the Ministry P&T, the Instituto Superiore Poste e Telecommunicazioni (ISPT) conducts telecommunications research and, also, standardization and testing of equipment. CSELT (IRI-STET) conducts research for the STET group in a manner analogous to that of Bell Labs for AT&T.

Key Organization Components of MPT

Four departments of the Ministry, Posts and Telecommunications are directly involved in providing either services or equipment. These are:

1. ASST (Azienda di Stato per i Servizi Telefonici). ASST is an autonomous public corporation responsible for planning, building, and operating the primary telephone network (the Italian coaxial cable and microwave links) which constitute the backbone of the Italian telecommunications system. ASST operates the international telephone service with European and Mediterranean countries, also the long-distance service between the main Italian telephone districts. Under its control presently are approximately 34,000 national telephone circuits and more than 6800 European telephone circuits.

2. DCST (Direzione Centrale Servizi Telegrafici). DCST in conjunction with the MPT operates the telegraph and phototelegraph services in Italy, together with the national and European telex service.

3. DCR (Direzione Centrale Radioelettrici). Ship-to-shore radio services are under control of DCR with actual operations being conducted by seven concessionaires: Radiotelevisione Italiana (RAI, Italcable, SIP, Telespazio, Radiostampa, SIRM, and Telemar.

4. AET (Applicazioni Elettro Telefoniche Spa). AET designs, constructs, and installs the major coaxial 60-MHz (transmission facilities in Italy) under contract and overall direction from ASST. AET engineers specify and supervise the numerous tasks: trenching; man-hole design; cable placement, splicing, pressurization, and final testing. Similar activities are provided SIP for systems operating at 4 and 12 MHz and using microcoaxial cable, for 2-8 and 34-Mbps facilities. AET also designs and installs local distribution systems utilizing standard multi-pair cable. AET also designs and manufactures a broad line of transmission equipment for voice/data systems. AET has developed and manufactured low-, medium-, and high-speed modems; provides complete data networks including diagnostic control equipment.

Key Service Providers of the STET Group

The largest telecommunications activity in Italy is the STET Group, with headquarters in Rome. As noted above, its beginning and development are grounded in the consolidation activities of IRI. The service consolidation described above was accompanied by an integration process within the telecommunications manufacturing sector, starting with the entry, in 1950, of SIT-Siemens (now Italtel) into the STET Group and the process was completed in 1969 with the acquisition of Selenia, Elsag, and SGS-ATES.

STET (Societa Finanziaria Telefonica p.a.

STET is the financial holding company for the Group and coordinates and supervises activities of the Group companies in accordance with long-range plans agreed upon with IRI.

The STET Group depends upon STET for coordination and supervision of the Group companies' activities which supply the greatest percentage of Italian telecommunication services. STET also is the financial management company of the group which reports to IRI. In addition to several service entities, the STET Group has as members several important industrial firms. These include Selenia SGS-ATES (Semiconductors) and Italtel (telecom equipment).

The Group's telecommunications investments for the period of 1980-84 are programmed at 10,000 billion lire (approximately $11.4 billion) most of this allocated to SIP. This investment, in a five year period, is equivalent to the amount invested during the previous fifteen years.

The operational companies of the Group encompass: telecommunications operating activities; manufacturing; plant construction; research activities; auxiliary activities.

SIP (Societa Italians per l'Esercizio Telefonica p.a.)

SIP was formed on 29 October 1964 by the merger of nine companies to operate the telephone service as a concessionary company for the entire country. STET holds a 60.69% majority interest in SIP.

The following data for the period 1968-1978 indicates the dramatic growth in SIP and the Italian telecommunications infrastructure:

GROWTH STATISTICS FOR SIP (31 DEC 1968 - 31 DEC 1978)

	1968	1978	Gain %
Subscribers	5,588,700	11,455,764	105
Extension Phones	2,165,294	5,631,874	160
Phones in Service	7,754,064	17,087,638	120
Phone Density	14.59	30.06	106
Local Installations	6,148,843	12,653,706	106
Local Network-km	14,199,747	49,776,812	251
Toll Network-km	4,315,879	19,583,103	354

SIP employs about 70,000 people.

ITALCABLE (Servici Cablografici, Radiotelegrafici, e Radioelettrici SpA)

Intalcable was formed in August 1921 to "plan, lay and operate submarine cables." In December 1941 it absorbed Italo Radio (operator of overseas radio links) and changed its name to Italcable. It joined STET Group October 1965. STET holds 67.5% of Italcable shares. Italcable employs around 3,000.

In 1968, the company was commissioned by the MPT to operate telecommunication services with non-European countries. During 1979, growth of telephone traffic was 22% due principally to the growth of calls originating in the United States; telex traffic was up 21%, cable traffic 1%. The company's telephone service network expanded in 1979, by 23%, and telex links by 10%. In this annual period almost 21 billion lire was invested in facilities (60% for telephone service plant and equipment). The Milan operating center is now complete and making use of satellite circuits via Lario; a third center at Palermo has been instituted.

The following data indicate the growth of Italcable:

GROWTH STATISTICS FOR ITALCABLE
(31 Dec 1968-31 Dec 1978)

	1968	1978
Phone Traffic (min)	3,690,000	66,152,000
Telex Traffic (min)	2,974,000	48,229,000
Phone Circuits	87	937
Telex Circuits	171	1805

Radiostampa

Radiostampa was established in August 1947 as the MPT concessionaire for telegraphy and radiotelegraphy for the press. Italcable holds 57.4% of the shares of Radiostampa. The company carries out on a national and international basis the services of press telegrams and photo-telegraphy and, nationally, the service of normal press messages. It also disseminates press bulletins to press-related or private customers, participates in national or international events, and provides real-time telex service to foreign correspondents.

Service Policies

The following companies currently operate public telecommunications services, and the majority of the stock capital is directly or indirectly owned by the State:

SIP - Societa Italiana per l'Esercizio Telefonico
(I.R.I.-STET Group)

Italcable - Servizi Cablografici, Radiografici e Radioelettrici (I.R.I.-STET Group)

Telespacio S.p.A. per le Comunicazioni Spaziali
(I.R.I.-STET Group)

and a few others for different kinds of services.

Telephone service is provided partly by the Concessionnaire Companies and partly by the ASST. The ASST provides the handling of long distance telephone service between 37 "districts" Including all major cities in Italy; the handling of international telephone service with all European countries and in the mediterranean basin; leasing point-to-point circuits.

SIP provides the handling of local telephone services for public use; the handling of long distance telephone services among 194 "districts" in Italy. Italcable provides the handling of the international telephone services with all extra-European countries except the ones served by ASST in the Mediterranean basin.

The domestic telegraph service is operated by the PTT.

Italcable provides the international telegram service, with the exception of a few countries in Europe and North Africa.

The PTT Administration provides the handling of domestic telex service and the international one for European countries; Italcable operates this service with all extra-European countries excepting a few in North Africa. This I.R.I.-STET Company also manages private telecommunications networks for the users who need their own network.

Telephone Service

The number of telephone subscribers and telephones were, at the end of '78, 11.4 and 17.1 million respectively. At the end of 1980 they were 13.0 and 19.3 million respectively.

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Considering these figures in connection with the population, the densities moved from 20 subscribers and 30 telephones per 100 inhabitants in '78 to the present values of more than 23 subscribers and 35 telephones in the middle of 1981.

There are several reasons pressuring the Italian administration to accelerate service improvement. Among these are: high level of connection requests and long waiting times; growing conviction that telecommunications is a vital infrastructure to the support of economic growth, productivity and the quality of life, especially in backward areas; and, a national desire to increase its role and prominence in international telecommunications markets and affairs. This pressure to accelerate is tempered by national desires to keep tariffs from escalating and to match expansion with Italian industry capacity to supply modern systems in large quantities.

Based on a balance of these factors, the Italian plan for the 1980 aims at densities of 38 subscribers and 57 telephones per 100 inhabitants by 1990. It is also expected that, during the 1980s, international traffic will increase more than 160%.

Italy's present plan has the following objectives:

1. 50% digitalization in local switching and 80% in trunk switching by the year 2000.

2. Corresponding progressive introduction of new services beginning in the early 80s.

3. Rapid evolution of the international switching capabilities for all services.

Specifications for the digital switching systems will be oriented towards further internal (Italian) evolution of the systems. Italian manufacturers will become more advantaged vis-a-vis foreign, including U.S., producers.

Telex

Presently, there are some 38,000 telex subscribers. There are over 13,000 telex subscribers who communicate automatically with subscribers in 21 European countries and 29 other countries. Service with about 60 other countries is maintained on a semi-automatic or manual basis. Automatic telegraph service is also provided by DCST between 1000 telegraph offices for national traffic and between 118 Gentex offices in Italy and about 700 Gentex offices in Europe and Libya. Main national and international telex exchanges are located in Rome and Milan.

Some forecasts have projected 95,000 telex subscribers in 1985 and 150,000 in 1990. However, Italian planners recognize that the forecast is significant only to 1985 since, in the following years, new opportunities offered by teletex, facsimile, word processing and so on will arise, thus jeopardizing the possibilities of further expansions of the telex service.

Data Transmission

Data terminal installations in Italy have been increasing dramatically from some 50,000 in 1978 to the present level of 92,000. This is expected to increase to 250,000 terminal installations in 1990.

All requests for data transmission services must be sent to SIP. For data transmission services the same tariff applies as for the telephone service. SIP provides telephone subscribers data transmission service for speeds higher than 200 baud over the public switched telephone network and leased circuits; SIP also supplies direct circuits for data and signal transmission.

The following networks are presently available for data communication services: domestic and international telephone network, domestic and international telegraph network. The public switched telephone network is available for services up to 300 bit/s, 600-1200 bit/s, 2400 bit/s; telephone leased circuits are available allowing data transmission at speeds up to 9600 bit/s. A specialized data network has been planned using both packet switching and circuits switching and is expected to be gradually activated starting 1983.

International Services

International telecommunication services are provided by Italcable who offers the following principal services:

- IRICON (International Information Service via Computer Oriented Network)--International network for automatic switching of messages and data.
- DARDO (Direct Access to Remote Databases Overseas)--Information systems for computerized gathering, storing and distributing data via Telenet and TYMNET.

- 50 kbps SCPC (Single Channel per Carrier)--High-Speed transmission of large volumes of data between Italy and the U.S. via satellite.

- AVD (Alternate Voice/Data)--Exclusive point-to-point leased circuits for alternate transmission of voice, data, or facsimile.

- LEASED TELEGRAPH CHANNELS--for heavy traffic subscribers between Italy and organizations located outside the European area.

- DATEL- Intercontinental transmission of data and documents.

As reflected in the Italcable growth statistics mentioned elsewhere, international service growth has been dramatic. The five year growth plan (1978-1983) anticipates further significant traffic volume increases (some 200% by 1983 as compared to 1978) due to increases in intercontinental direct dialing and increases in intercontinental links.

The increase in intercontinental links has led to a corresponding expansion of the land coaxial and microwave radio network connecting Italcable's terminal stations and the Telespazio earth station at Fucino with the large complex of the Acilia Operating Centers and these with the Rome centers of ASST and SIP.

Resale/Shared Use

Shared use of national or international leased circuits and their resale is not permitted.

In deciding on the use of the public data network rather than private leased circuits (which can be given only by the PTT or the concessionary companies), the user follows his convenience depending on the quantity of traffic he has to transmit.

Telegraph circuits are provided for the exclusive use of the renter and the same applies to international leased circuits for data transmission.

New Services

Experiments are in progress for new services such as teletex, video teleconferencing and videotex (named Videotel in Italy). Significant diffusion is expected only for the second half of the 80s and forecasts regarding quantities of terminals for teletex and teleconferencing are not available. Videotel is expected to be introduced into public service during 1983 with forecasts of 350,000 terminals in service by year end 1987.

The Italians are moving towards the integrated services digital network (ISDN). Their concept envisions a rather all-encompassing, intelligent network. There are no plans to de-regulate the value-added portions of this network.

Equipment and Interconnection Policies

Modems supplied by SIP are normally mandatory in Italy for data transmission on private circuits and on the public switched telephone network. Maintenance is included in the rentals. Terminal equipment can be obtained from certified manufacturers. Approval from a special "agency" of the PTT is required before any private equipment may be attached to private circuits and to public networks.

Type-Approval

Type approval is required for all terminals to be connected to the public networks and the authority conpetent to give type approval is the Ministry of Posts and Telecommunications.

Applications for type approval of every new terminal must be submitted to the Ministry of Posts and Telecommunications by the manufacturers or by their legal representatives in Italy.

The equipment for which a regular type approval has been obtained may only be installed by authorized firms. Authorizations are granted by the MPT.

Future Competitive Access

There are no substantial changes contemplated in the policies for the provision of basic telecommunications services; for the availability and use of private leased lines; or the connection of equipment to the public network. Consequently, no service liberalization is anticipated in Italy. The equipment market conditions will stay between status-quo and more restrictive, the latter condition possible because of increased reliance on national technology and products as explained below.

Telecommunication equipment markets are controlled by the MPT and the STET Group. Although the STET Group manufacturers of telecommunication equipment do not have a monopoly on supply of such equipment to STET, Italtel supplies 40% of the STET-required telecom apparatus and SIRTI installed 60% of the transmission equipment placed in operation, in 1979. Italtel also provides about 60% of the Italian PABX market. Italian switching and transmission markets are affected by a close working relationship between government controlled service providers and Italian manufacturers. This has received new and enlarged emphasis of late due to the development of the Italian national Proteo system and a decision to rely more on local manufacturers. The collaboration on the development and utilization of the Proteo line of products serves to limit and narrow the openness of this market segment.

Proteo is a digital switching system developed by ITALTEL for the public telecommunication (TLC) network and is the first and most important initiative of the Italian manufacturers in the electronic switching field.

Since the early stages of design the system was conceived to aim at an integration of digital transmission and switching techniques, open to services integration (telephony, data, etc.).

The system development was supported by: national operating bodies (ASST, SIP, ITALCABLE) as regards the specification definition and planned evolution towards an integrated services digital network (ISDN); Italcable, the Italian operating company for the intercontinental traffic, who has actively participated with Italtel in the setting up of the specifications of the exchange for the intercontinental traffic field; by CSELT laboratories as regards the research cooperation on the definition of fundamental system features; and by SGS-ATES manufacturer for developing advanced custom components.

The current Proteo products, as of 1981, are installed in more than 50 new public exchange plants accounting for more than 130,000 subscriber equivalent lines. In the next two years the delivery of more than 500,000 equivalent lines is planned, as Proteo plays a basic role in the conversion of the Italian TLC network from traditional to digital techniques.

The PABX market is relatively (as compared to service provider switching exchanges) more open but subject to MPT supplier authorization and equipment type approval.

SIP (STET Group) leases PABX equipment to users and supplies consultancy services free. It tests public network installations and provides maintenance for such equipment. Italtel (also of STET Group) supplies about 60% of the PABX needs. AET, a unit of MPT and traditional emphasis on transmission products, is making a feasibility study to design, manufacture, and sell PBXs in the small to medium capacity range, for the Italian market. This segment, too, seems to face a declining openness for U.S. manufacturers.

JAPAN

Organization Structure

At present, domestic telecommunications services in Japan are provided by a government-owned public corporation, Nippon Telegraph and Telephone (NTT). NTT provides all services, both long-distance and local.

International services are provided by a single franchised private corporation, Kokusai Denshin Denwa Co., Lt. (KDD) which interconnects with NTT at international gateways.

This arrangement, coupled with a close working relationship between NTT's research staff and Japanese industry, has allowed a rapid rebuilding of the Japanese telecommunications system in the post-war era to the point where it is one of the finest in the world. Universal, reliable service, undreamed of even 15 years ago, is a reality and great strides have been made in the introduction of new digital services for data communications.

However, having reached a mature, facilitated, state the NTT monopoly has come under similar pressure as has affected other monopolies worldwide. In the winter of 1980 a special advisory committee began the examination of all government monopolies. The final recommendations of this committee were presented to the Prime Minister in August. They recommended that:

- NTT be sold to the private sector.
- NTT's network be divided between competitive and monopoly services. Competitive services would be divested and provided by a private company in an unregulated environment. Monopoly services would be provided by a regulated entity.
- That regulated entity should be further divided into local and long-distance service companies.
- New service providers be allowed to build long-distance facilities to compete with NTT.
- The provision of customer equipment be completely deregulated (except for technical standards) and NTT's equipment leasing and sales arm should be divested.

These recommendations are highly controversial in Japan. In many cases the same questions which have so long plagued the U.S. have been raised, including interconnection of new competitive carriers with NTT local facilities; continued quality service to rural areas; and detarifying of terminal equipment.

It is clear that not all of these recommendations will be adopted, even though legislation to consider them will be introduced this spring. However, some of them will be adopted and the structure of the Japanese telecommunications industry will change accordingly. We will present both the structure and policies as they exist currently and reconsider the proposed changes in the section entitled "Prospective Changes."

Nippon Telegraph and Telephone Public Corporation (NTT)

NTT was established in 1952 under the "Nippon Telegraph and Telephone Public Corporation Law" (Law 250, 1952). NTT, which monopolizes domestic public communications services, had total assets of ¥9,459 billion ($43,996 million) as of March 31, 1981. Revenues for fiscal 1980, (ending March 31, 1981) amounted to ¥4,006.3 billion ($18,634 million). Nationwide, there are more than 39 million subscribers and over 56 million telephone sets, in a population of 117 million. NTT undertook a series of five-year expansion programs starting in 1953, one year after its establishment. These programs have succeeded in giving Japan a domestic communications system which is modern, efficient and comprehensive. The sixth program, which started in 1978, has a total construction investment budget of ¥9 trillion ($41,860 million). This program will be the last such program.

There were some 56.3 million telephone sets in Japan as of March, 1981, for a distribution ratio of 47.9 telephones per 100 population. Local dialing reached 100% by March, 1980.

NTT Network and Service Trends

With the public demand for telephone service fully met, Japanese telecommunication networks are now evolving to provide common telecommunication vehicles for non-voice as well as enhanced telephone services. Mobile and other enhanced services have been added to the telephone network by making use of the SPC technology introduced in the last decade. Digital data networks have been put into service. A facsimile communication network has been constructed. In this way, NTT is expanding individual networks to meet present demand. It is also taking steps to meet diverse future demands. Two digital switching systems, D60 and D70, have been developed both to economize the telephone network and to lay the foundation for development toward an ISDN.

Push button, key and automatic answering and recording telephones are increasingly becoming standard equipment. Data telephones which enable push button telephone users to handle simple data communications have recently been introduced. By adding a magnetic card reader, a simple display unit and a simple printer to the telephone, users can verify credit cards, obtain inventory information and the like.

As the first step in enhancing telecommunication network capabilities, NTT is rapidly introducing SPC switching systems, because of their inherent ease of functional modification.

As the second step in enhancing telecommunication network capabilities, NTT has begun introducing digital switching systems, keeping pace with the spread of digital transmission systems. It is planned to introduce digital systems into the network in the following evolutionary stages:

Stage 1 - Digitalization of the toll network;
Stage 2 - Digitalization of local networks; and
Stage 3 - Digitalization down to customer stations.

Common Channel Signalling (CCS)

Introduction of a CCS system between SPC switches permits transmission of a variety of control information between them, and provides a basis for enhancing network capabilities.

The D10 CCS system, which complies with CCITT No. 6, was introduced in 1973 and now is in use between five toll switches. However, NTT is constructing a new CCS network using an improved signalling system that complies with CCITT No. 7. This new CCS network is more readily applicable to non-voice services. At first, a CCS system will be introduced between SPC toll switches. Two signal transfer points will be installed in each of the four signalling areas in the country, by 1982. The signalling network will carry not only ordinary telephone signalling, but also subscriber data for mobile telephone and facsimile communication.

NTT Data Networks

In addition to its traditional telephone and telex networks, NTT has established a circuit switched data network and a packet switched data network. The telephone network has been supplemented by automobile, and maritime mobile networks. A new facsimile network is also ready for connection to the telephone network.

Circuit Switched Network

The DDX (digital data exchange) circuit switched network has been in service since December, 1979. It consists of a digital switch, labelled D50 CS, in Tokyo and Osaka, and also four concentrators in Tokyo and three other large cities. These are interconnected by digital transmission lines.

Demand concentrates on high speed services of 9,600 b/s and above, for which the DDX network proves more economical than the telephone network.

Packet Switched Network

The DDX packet switched network was put into service in July 1980. A packet switch named D50 PS, that was installed in Tokyo is connected to 79 packet multiplexers, or PMX, in Tokyo and 30 other cities. The network will be expanded rapidly. The network includes four packet switches in Tokyo and Osaka, interconnected in mesh.

The packet network was serving 61 customers with 753 lines as of July, 1981 and this number is increasing rapidly. The ratio of synchronous terminals to asynchronous terminals is twelve to one, again showing a preference for higher speed services. Interworking connection between the packet network and the telephone network is under development. This will permit the telephone network to concentrate data traffic from low speed terminals, before it is admitted to the packet network. Such economical traffic concentration is expected to give an impetus to packet service demand.

Data Communications Circuits and Services

Under the provisions of the Public Telecommunications Law, two public corporations have exclusive control over Japanese data transmission circuits: Nippon Telegraph and Telephone Public Corporation (NTT) for domestic communications and Kokusai Denshin Denwa Co., Ltd. (KDD) for international communications services.

NTT Data Communication Service

Data services can either make use of NTT's public circuit and packet switched networks or make use of private networks via lines leased from NTT. Data Communication services provided by NTT can be classified into the following two broad categories:

1. Data Communication Circuit Services

   NTT provides communication circuits for data communication systems installed by individual organizations. Data Communications Circuit Services, in which the customers use their own computers while NTT provides communications circuits only, are classified into Specific Use Communications Circuit Service and Public Network Service. During fiscal 1980, 17,000 specific use circuits and 11,000 public communications circuits were added, bringing the total of the former up to 100,000 and that of the latter to 34,000.

   In the Specific Use Circuit Service, NTT leases communication circuits for sole use by customers. Customer-owned data communication system components, such as computers and terminal equipment can be interconnected via NTT's communication channels.

   In the Public Network Service, NTT provides data communication services using its telephone or telex network.

   Customers who install their own computers and terminal equipment can be connected by the network.

   There were 23,571 public communication circuits as of March 1980.

   The systems which use public communication circuits are divided into two categories; one is linked to the telephone network and the other is linked to the telex network. The former has become available since August 1973. There were 19,738 circuits as of March 1980. The latter has become available since November 1972.

There were 3,833 circuits as of March 1980. Monthly rates for these services are the same as the rates for telephone or telex service. These services are limited in speed--to 1200 bps for the telephone network and 50 bps for Telex.

2. Data Communication Facility Services

Since data communication services require highly sophisticated technologies, integrating computer and telecommunication technologies and NTT had extensive experience and resources in this field, NTT has been expected to satisfy the nation's requirements for certain data communication services and to promote the computer technology development.

Here, all facilities such as computers, terminal equipment and communication circuits, are provided by NTT.

Data Communication Facility Services are classified into the following two categories.

a. Public Data Communication Services [e.g., DEMOS--a Scientific and Engineering Service and and DRESS--Sales and Inventory Management Service].
b. Specific Use Data Communication Services

The Public Data Communication Services systems provided by NTT are shared by a number of users. The Specific Data Communications Service systems are tailored to meet the unique needs of customers.

Public Data Communications Services, DRESS and DEMOS, have been improved with the provision of additional function centers and the incorporation of accessible high-performance, low-cost terminal equipment.

As a result, the number of users and terminal equipment of DEMOS reached 1,800 and 2,100 respectively at the end of fiscal 1980, while those of DRESS 1,500 and 5,700.

Specific Use Data Communications Services have been developed, giving priority to public systems to promote social welfare and social development, nationwide network systems, and systems to contribute to the development of pioneering technologies. During fiscal 1980, five new systems, the Emergency Medical Information Systems, city banks cash-dispenser system, and local banks cash-dispenser system, were added to bring the total to 55 systems at the 1980 fiscal year end.

International Service Policy and Services

Kokusai Denshin Denwa Co., Ltd. (KDD)

In addition to NTT which monopolizes and operates domestic public communications networks, another important organization in the Japanese communications market is Kokusai Denshin Denwa Co. Ltd. (KDD) which monopolizes and operates international telephone and telex networks to and from Japan.

KDD was set up as a private company in 1953, one year after NTT was established. Facilities and personnel came from the Ministry of Communications, the predecessor of the present Ministry of Posts and Telecommunications.

KDD operations in international communications including data communications services are defined and restricted by the KDD Law. KDD operates one communications line between its Ibaraki Satellite Communications Center and the head office in Tokyo, a distance of some 50 miles, but leases other domestic lines from NTT.

KDD provides two types of international leased circuits: telegraph-grade circuits and voice-grade circuits. Telegraph-grade circuits are for teleprinter communications, while voice-grade circuits are not only for telephones, but also for the high speed transmission of data, facsimile and photos.

KDD Services

There are several types of systems. The first is for co-use of KDD facilities and is called AUTOMEX (Automatic Message Exchange Service). This system started in March 1973 and provides message switching within a customer's system for customers leasing two or more international telegraph channels. As of March 1981, there were 25 users with 246 terminals.

The second system is a customized service started in 1976 and provided by KDD at the request of the user. This service is for message switching between head offices in Japan and branches overseas.

On September 8, 1980, KDD began the first international data communications service to be offered in Japan called International Computer Access Service (ICAS). ICAS functions to provide Japanese users with data base access to economic, scientific and technological information stored in computer systems or VANs (Tymnet and Telenet) installed in the U.S. KDD currently operates ICAS transmission circuits with three U.S. international record carriers: RCA Globcom, ITT Worldcom and Western Union International. The service was extended to the U.K., France, Spain, Switzerland and Canada in April, 1982.

In April, 1982 KDD made available its VENUS-P International Packet-Switched Data Transfer Service. This service allows data to be transmitted and received between computers and/or terminals at transmission speeds of 2,400 bps, 4,800 bps and 9,600 bps (bits per second). Service is available with the U.S., the U.K., France, West Germany and Spain.

An international packet switching system, DS-1 has been developed and its international interworking test has been completed. It is now undergoing testing of its interworking with the NTT's DDX packet switched network. DS-1 will initially provide a packet switching service for X.25 interface terminals. Later, it will also provide a store and forward message switching service.

Telex Service Compatibility Problem

Two types of telex equipment are used in Japan causing some users to complain to us in market studies we have conducted and bears mentioning. KDD's telex system for international services uses the international telegraph alphabet No. 2 five unit code system, while NTT's telex system mainly for domestic services uses the JIS (Japanese Industrial Standard) six-unit code system. The domestic six-unit code is connected to the international five-unit code through KDD for overseas services.

Other Services

Telex Service

Although telex service has been widely used for message communication between enterprises, communications with foreign countries, and business slip transmission, the number of subscribers decreased by 5,400 during fiscal 1980 to 58,000. This is attributable to a shift in customer preference to other services such as facsimile and data communications.

Leased Circuit Service

Leased circuits are widely used for voice, data and facsimile transmission, as well as for radio and TV hookups. During fiscal 1980, the number of leased circuits increased by 4,000 to 302,000 at the end of the year.

Mobile Service

Automobile telephone service was started in the Tokyo area in December, 1979, and in the Osaka area in November, 1980. Customers in more than one hundred cities in these areas numbered 8,800 at the end of July, 1981, and are increasing rapidly.

Control of the 800 MHz, small zone, cellular, automobile telephone system is provided by the SPC systems installed in the Tokyo and Osaka toll centers. Nationwide telephone subscribers and the automobile subscribers can be interconnected by subscriber dialing.

Facsimile Communication Network

As the handiest recorded message media in a country where Chinese characters are in use, facsimile service demand is growing at the rate of 20 to 30% annually. About 180 thousand terminals are in use, connected to either the telephone network or leased lines.

A new facsimile communication network, which takes advantage of the facsimile characteristics of uni-directional communication and allowance for delayed delivery, has been developed and is ready for service in both the Tokyo and Osaka areas. Functional division between the network and terminals has been made in such a way that economical terminals can be designed, while the enhanced facilities listed below can be provided by the network.

- Automatic facsimile document delivery to the destination terminal, without bell being rung.
- Automatic recalls by the network to a previously busy called terminal, or notification of undelivered messages to the calling terminal.
- Automatic recording of calling terminal ID.
- Facsimile signal compression and high speed, digital packet multiplexed transmission of the compressed signal.

The facsimile communication network is composed of local telephone networks for facsimile traffic concentration and a dedicated transit network comprising D10 systems for connection with the local telephone network, facsimile storage and conversion equipment installed in toll or higher-level centers, and digital transmission lines to interconnect them.

Message switching services

Only NTT and KDD offer commercial message switching services at present. Message switching for sending information without intermediate processing by NTT or KDD is strictly prohibited under government policy.

The Round-Table Conference on Telecommunications Policy, a private advisory organization to the Ministry of Posts and Telecommunications (MPT), in a submission to the Minister on August 24, 1981 entitled "Telecommunications Policies in the 1980s", recommended a more open policy on message switching. Such switching is to be allowed only between companies which have a specific business tie-up, such as parent companies and subsidiaries, and which use transmission lines jointly. Message switching will be allowed for third parties only on a "case-by-case" basis.

Broadband Communication Network

The Post and Telecommunication Ministry of Japan, and NTT have jointly developed a videotex system called CAPTAIN (Character and Pattern Telephone Access Information Network System), which transmits still picture images to TV sets over telephone circuits. An experimental service was started with one thousand terminals in Tokyo in December, 1979. About 100 thousand video images, provided by 165 organizations, are available to customers. Picture images are transmitted without being compressed because they include numerous and complicated Chinese character patterns.

Larger bandwidth video communication is becoming practical, owing to progress in optical fiber transmission and satellite communication technology. NTT is developing a VRS (Video Response System) for moving pictures, and a Simplified and Extended Videoconference System for video terminals at customer's premises.

The structure of a broadband network is under study, with a view to achieving:

- common use of broadband circuits by a variety of broadband services;
- reserved connection and non-delay connection;
- high speed digital switching;
- customer choice of bandwidth compression;
- bi-directional and uni-directional communication; and
- multi-address connection.

INS (Information Network System)

NTT's fundamental idea of INS is to provide the Japanese people a new infrastructure for the next century. NTT is closely investigating possible applications like video conferencing, videotex, electronic banking services, etc. to be accommodated in INS, but the major thrust of INS is to have a better system (not services) and a better rate structure. Although INS has to have some information processing capabilities in it so far as to be in compliance with the public interest, it is intended that most of the applications oriented service functions is to be open to private sectors.

NTT is going to begin installation of INS in early 1983, and expects the first INS experimental city in Mitaka City (suburban Tokyo) to be completed in 1985. NTT's INS may be properly considered a true Integrated Services Digital Network (ISDN).

Also, one should keep in mind that the INS system, service and tariff structure will be impacted by the proposed NTT reorganization [See Prospective Changes].

Resale and Shared Use

Until very recently, resale and shared use of NTT services or leased circuits was prohibited. As a result of the recent ammendment to the Telecommunication Law of Japan (June 1982), restrictions on resale and shared use policies have been eased to a substantial extent. The new policies are explained as follows:

Shared Use - As long as the major purpose for shared use is not message switching, any kind of shared use of leased circuit is allowed. Pure message-switching is not allowed for third-party use. There is no message-switching limitation among parties with a close business relationship. MPT determines "close" on a case by case basis.

Resale - Resale in basic service is not allowed. Resale for enhanced[*] service among small and medium-class businesses, however, is allowed. Expansion of this policy to include big businesses and nation wide network (so-called VAN) is currently under consideration.

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[*] "Enhanced" is used in Japan to denote the addition of information processing. It does not include 'value added networks' (VANs) as is the case in the U.S. conception of enhanced.

NTT Data and Information Services Policy Background

Japan's on-line information processing was started with a seat reservation system for the Japanese National Railways in early 1964. Since then, many firms have strongly tended toward introduction of computers for the rationalization of their management. NTT offered telecommunication circuits, as leased circuit service, to meet the requirements for data communications within such firms in those days. Facilities involved in on-line data processing, including computers, were classed as telecommunication facilities by NTT. If such facilities were to be connected to more than a single firm, the service was to be operated exclusively by NTT under pertinent legislation at that time pertaining to telecommunications in Japan.

The data communication service that NTT offered for the first time was an inter-local bank data communication system, inaugurated in 1968. This system could be realized only by NTT in Japan under the legal environment mentioned above. NTT believed that it was desirable for the development of data communications to apply positive technologies, which NTT had been cultivating in the telecommunication field, to the data communication field. Since then, to meet demands for data communications, NTT has been developing new systems, such as Motor Vehicle Registration and Inspection System for the Ministry of Transportation, Sales and Inventory Management Service (DRESS) and Scientific and Engineering Calculation Service (DEMOS-E) for medium and small size enterprises, who could not afford to own computers and operate them for themselves alone.

In the meantime, to meet strong industrial demands, the Public Telecommunications Law was revised in May 1971 to allow connections between computers and communication circuits. Thus, an institutional foundation for data communications in Japan was established. Under the revised Public Telecommunications Law, it became permissible for different enterprises to share telecommunication circuits. Also, private enterprises were permitted to set up a data communication business, using the public telecommunication network for data communication purposes.

Emergence of Private Commercial Data Communications Services

Until 1971, when the Public Telecommunications Law was revised to allow private companies to provide time sharing services (TSS), only NTT offered domestic data communications services.

Various enterprises have successively entered data communication service business activities since this revision of the Law. There were 83 enterprises with 122 systems at the end of December 1979. Today, the information processing industry in Japan is quite competitive with over 200 firms, including NTT, actually competing in this market. NTT began its shared time Sales and Inventory Management Service (DRESS) and Scientific and Engineering Service (DEMOS) in 1970 and 1971, respectively. NTT gives priority to:

1. public-oriented systems

   (ex. Emergency Medical Information System)

2. nation-wide network systems

   (ex. Nationwide Banking System)

3. systems which take the lead in technological development

   (ex. En-Route Radar Data Processing System)

Thus, they don't compete in all market segments.

U.S. firms led by IBM Japan and General Electric were the first to offer private commercial data communications services after the law was revised. IBM Japan provided its IBM CALL/370 service and G.E. through a joint venture with Dentsu, the largest advertising company in Japan, its MARK-III service in early 1972. IBM (Call 370, RJE, etc.) and Dentsu-GE (Mark III) are major powers having approximately 50% combined market share.

Not all U.S. firms have been as fortunate as IBM or G.E. in being able to provide TSS in Japan. For example, when Control Data Corporation (CDC) tried to start its CALL/370 service through Data Service Far East, it had protracted negotiations with the Japanese government before finally receiving permission to start the service in 1977. Conditions have improved since then, especially in circuit use restrictions which was a main point of contention in the CDC case. Traditionally, most of these services have been offered via the public switched network.

As a result of the recent Telecommunications Law amendment, information services providers are now allowed much more freedom in selecting their network configuration. They may now choose the most appropriate elements among the public switched network (telephone network), packet switching network (x.25), circuit switching network (x.21), and shared use of leased circuit.

The demand for international TSS has been increasing among Japanese firms. KDD's International Computer Access Service (ICAS) by making the use of international data base services readily available has accelerated this trend.

Equipment and Interconnection Policy

NTT has no manufacturing capability but it does work quite closely with several Japanese equipment manufacturers, notable Hitachi, Nippon Electric Corp. and Fujitsu. Indeed, until the late 1970s these firms made up what was called the "NTT family", providing about 40% of NTT's equipment needs.

NTT operates and monopolizes the domestic public telecommunications networks. Any customer-provided equipment must conform to NTT technical requirements. Any interconnect or hookup equipment which might cause interference in the NTT network requires NTT approval. Once type approval has been obtained for the equipment it is free to be used.

Generally speaking, NTT sells or leases the vast majority of customer telephone equipment while a larger portion of business equipment (PABXs) are sold directly to customers by private companies.

Prior to the new agreement on procurement, U.S. manufacturers were reluctant or found it difficult to obtain certification from NTT for the sale of equipment in Japan. This situation has seen major policy and procedural revisions.

Based on the GATT Government Procurement Code and U.S.-Japan Agreement on NTT Procurement, NTT adopted a new procurement system in January 1981. Despite slow responses from American companies in the first year, joint efforts of the U.S. Government and NTT have resulted in gradual participation of American manufacturers into NTT's procurement activities. For equipment to be used internally by NTT, a three track procurement system was created.

Track 1

Track 1 will be used when procuring any products which are subject to the "Agreement on Government Procurement."

Under this procurement, as of December 1982, a total of 91 foreign companies were qualified for 48 products such as high-speed modems or magnetic tapes for information processing. Since November 1981 the number of qualified companies has increased by 65 and the number of different products by 36.

So far, 33 foreign companies have made successful biddings in a field of 28 different products, including equipment for LSI production and magnetic tapes for information processing. This means that the number of successful companies and products almost tripled since November, 1981. The total amount of procurement with foreign firms in Track 1 has reached about $14.3 million (3.58 billion yen).

Tracks II, III and II-A, III-A

Track II will be used when procuring public telecommunications equipment which is now available in the marketplace, and covers products which can be placed in service as they are, or which are capable of being modified as required.

Track III will be used for the procurement of public telecommunications equipment not yet available in a suitable form in the marketplace and which must, in the opinion of the corporation, be developed especially for, or in conjunction with, the corporation.

Tracks II-A and III-A will apply when NTT makes a Follow-On Procurement of any product which it previously purchased under Track II or III. These two tracks provide the procedures under which NTT will accept offers for the supply of products which are more advantageous to the corporation than existing ones.

NTT placed public notices up until December of 1982 which invited participation for development on 16 different products. As a result, the corporation received applications for development of a bothway repeater, a conference telephone repeater, and a domestic satellite echo canceller terminal. AT&T has already been selected to supply the terminal (see page 5). Another application from an American company subsidiary in Japan is now being reviewed for transportable digital switching systems for emergency use.

Between January, 1981 and December, 1982, over 165 foreign firms visited NTT in Japan to make presentations on their products or inquiries about procurement procedures. NTT expects the number of these visits to continually increase.

Type Approval for Interconnect Products

In addition to the three-level purchasing system, a new opportunity has become available to U.S. suppliers of telecommunications equipment based on the "Joint Agreement" on the interconnect market between the U.S. and Japanese governments dated December 19, 1980.

It is very important to understand the use of the word "interconnect." NTT uses the phrase "customer-provided equipment" instead of "interconnect" to mean telecommunications equipment installed and maintained by private companies other than NTT. Tracks I, II and III, on the other hand, involve procurement by NTT and the equipment in these categories is installed and maintained by NTT.

NTT has instituted a positive assistance program to assist U.S. firms in entering the Japan interconnect market. NTT held several orientation meetings on its interconnect market in collaboration with the U.S. Department of Commerce, the U.S. Trade Representative and the American Embassy. These seminars were held in Washington, D. C. and Los Angeles, and were attended by close to 100 American representatives.

While NTT supplies the majority of the telephone equipment in Japan, it controls only a minor segment of the other major equipment sales opportunities in the market. The following table shows equipment sales in the respective markets during 1981:

INTERCONNECT EQUIPMENT SALES

	NTT	INTER-CONNECT
	(in millions)	
Data Terminal Equipment	$160	$436
Facsimile	23	284
PBX	16	87
Telephone Equipment	287	138

While the market has always been open to foreign suppliers, U.S. companies previously complained of having problems obtaining NTT approval of their products. Originally sophisticated equipment, such as PBXs and key telephones, required individual approval as opposed to type approval. Individual approval requires applying for approval on each and every installation. The U.S.-Japan procurement trade negotiations led NTT to institute a uniform type-approval process for all interconnect equipment. Now, any interconnect equipment connected to NTT circuits or equipment must meet the following conditions:

1. Customer provided equipment must conform to technical requirements which have been established by NTT under the approval of the Ministry of Posts and Telecommunications. In addition, the equipment may be used only after being checked by NTT.

2. The installation and maintenance of customer-provided equipment connected to the network must be conducted by engineers who have been recognized by NTT to have special knowledge and technical skills, who have demonstrated their expertise by passing an examination, called "recognized engineers."

Other facilitating reforms spurred by the negotiations include converting technical information from Japanese to English and accepting test data from foreign firms and laboratories in order to fulfill the requirements for type approval in a non-discriminatory manner.

NTT has been implementing these reforms and has made entrance into the interconnect market much easier for foreign suppliers. As of August, 1982, five foreign companies received type approval for nine of their products.

The ROLM Corporation obtained the first type-approval among all suppliers for digital PBXs. Plantronics' head sets and ITT's desk telephones have also passed type-approval from NTT.

PROSPECTIVE CHANGES

Reevaluation of Primary Instrument Doctrine

The connection of customer provided equipment which meet NTT standards has always been allowed. However, NTT has maintained a requirement that NTT supply the first telephone instrument (primary instrument doctrine).

An intensive study is now being conducted regarding the departure from the current primary instrument doctrine. The direction of the new doctrine has almost been established, the issue now at hand is how and when to affect implementation.

Organization Restructuring

Having reached a mature and facilitated state of operations, the NTT monopoly has come under pressure to reorganize itself, a pressure being felt by many other monopolies worldwide. In July 1982, the Second Ad Hoc Commission on Administrative Reform in Japan submitted to the Prime Minister a final report on NTT, advocating that NTT be subdivided into a series of smaller, privately managed companies. The report listed what the committee felt were serious problems for the future of NTT, and how these problems could be solved by turning to private management.

Problems

Due to the nature of government agencies and due to the nature of the communications industry, NTT is faced with some long term problems regarding labor expenses, personnel management, budgetary decisions, and employee motivation. In the late 60s and early 70s, NTT was installing as many as three million telephone lines a year in Japan. Since 1977, however, the annual demand for new telephone installations has dropped to the 1.2 or 1.3 million level. Thus, the future telecommunications businesses in Japan will move from quantitative to qualitative services improvement, incorporating the fruits of technological innovation. This presents a long term dilemma for NTT. Since 1977, while the annual growth of telephone subscribers declined, operation costs have been steadily rising. This means NTT must be forced to raise its rates in the near future again. The first time NTT ever raised its rates was in 1976.

One third of NTT's operating expenses go toward personnel costs. Since NTT employees are leveled to the wages of other public corporations (The Japan National Railroad, The Japan Tobacco & Salt Public Corporation), and government agencies, both management and employees have little incentive to improve efficiency. The company is experiencing difficulty in utilizing the surplus work force which has been realized by technological advances.

Another problem lies in the fact that NTT is subject to government budget policy. Besides being bound to political considerations which are not directly related to NTT, the budget is strictly controlled by the government, which hinders the company from executing flexible and business-like operations.

Solution

According to the Ad Hoc Committee, in order to provide low-cost telecommunication services while increasing technology development powers, NTT must have autonomy in its business decisions. In addition, since the company is subject to the pitfalls of large monopolies with huge unwieldy infrastructures, NTT must be denationalized, and free competiton should be introduced into the telecommunications industry.

The committee proposes that NTT be separated into one central company, which will handle all aspects of trunk lines, along with several smaller "local" companies who will be responsible for operating local telephone services. In addition, new companies will be allowed to enter into the trunk line market to promote free competition. While it is expected that the new private companies must pay taxes and stock dividends, the increase of these expenses should be offset by management rationalization, and due attention should be given to improving service levels. It is also necessary to pay due consideration so as not to make disparities in communications services between regional areas, which may be caused by profitability differences in these areas. Thus, proper rates structures which reduce rate discrepancies between long-haul and short-haul calls and proper revenue separation and settlement methods shall be established.

The committee suggests that NTT be transferred to a "special" company for the time being, all of whose shares shall be held by the government until proper allocation and separation can be affected.

Despite former Prime Minister Zenko Suzuki's announcement that he will highly respect the recommendation from the Commission and push the political and administrative environments as far as possible toward the direction to comply, how to implement the idea is not yet clear.

Considering the strong opposition from Key Congressmen, the administrative agency (MPT: Ministry of Post & Telecommunication) labor unions, etc., many people observe that it's very difficult to implement the whole idea of the Commission.

Dr. Shinto said in a press meeting that while continuing his study in preparation for any required organizational changes, it is too early to have a conclusion that would be consistent with the recommendations because NTT, as part of a government agency, is only obliged to comply with the final interpretation yet to come from the Congress and Government. It is significant that the MPT has not devised a policy response to the pro-competitive pressures nor is it sure to what extent they should move in this direction.

Competitive Access

NTT was modeled after the American Bell system without an in-house production capability. Rather, NTT selected certain Japanese manufacturing firms and worked closely with them to develop advanced communications products. These firms became part of the "NTT Family" and were nurtured and protected by NTT and government procurement policy.

Similarly, NTT has been instrumental in building up Japan's computer industry by conducting joint research and development with infant computer companies and then using its procurement power to enable their rapid economic growth. This succeeded in making domestic computer makers competitive with American giants such as IBM.

With the conclusion of negotiations between Japan and the U.S. in 1980, NTT has opened its doors to foreign suppliers. NTT procurement power as a percentage of the total market is expected to decline in the coming years as the private market picks up many of the rapidly growing sectors of the communications industry, such as message switching and customer premises ("main station") equipment.

Although the impact of this move has not been felt immediately, it is expected that U.S. equipment sales to NTT and others will grow slowly but steadily in the future. The current trade friction between Japan and the western nations is exerting pressure on Japan to open up its markets to foreign goods and the communications industry can be expected to benefit from this situation.

Competitive access by U.S. carriers to the Japanese market for advanced telecommunication and information services is quite likely in the near future--coupled, of course, with competitive access to the U.S. market for Japanese service providers.

There are two qualifications to this, otherwise, positive outlook. One, a complete restructuring as envisioned in the administrative reform commission's proposals could serve to restrict further access insofar as new service entities (Japanese)* have or may develop ties with home manufacturers which would create conditions favorable to market preemption, though not a government or policy barrier. This theory would hold, then, that the U.S. is better off with its bilateral trade agreement than in a vastly restructured telecommunication sector.

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*Foreign, including the U.S., providers of telecommunication facilities and services is not expected in Japan except possibly in the domestic satellite area. If this occurs, this could diminish this concern.

On the other hand, the full range of this proposal is, in all likelihood, not going to occur. This leads to the second qualification. In this scenario, NTT remains a rather comprehensive supplier. Without rather firm boundaries between the network and customer premises equipment and between telecommunication services and information services, there remain potentials for cross-subsidies and the like which could restrain market development. However, there are offsetting forces that will serve to diminish this concern. These are:

1. Already, two-thirds of Japan's interconnect market is private, i.e, outside NTT's purview;

2. NTT is not an across-the-board information services provider and MPT appears to desire a competitive environment in this sector;

3. Domestic industry forces will serve to keep a check on NTT; and,

4. MPT and NTT will probably come forth with some boundaries, structural separation or otherwise, despite the outcome of the reform commission recommendations. However, MPT and NTT do not appear to be in agreement at this time as to what these should be.

MEXICO

Organizational Structure

The telecommunications administration of Mexico comes under the control of the Secretariate of Communications and Transport (SCT) which both operates the public telecommunications network and issues operating licenses for private telecommunications services. The SCT, itself, is a department of the Government of Mexico. The Directorate General of Telecommunications (DGT), which is a part of the Secretariate, is responsible for the planning, administration and operational provision of telecommunication services. This includes not only those services provided by the Federal Government, but also those services for which franchises in the form of licenses have been issued by the Federal Government. In addition, the Directorate General provides domestic and international TELEX, data communications, video distribution and international telecommunications services.

Domestic Mexican telephone services are provided by a group of licensed, franchised, telephone companies. In the past several years these small independent companies have been absorbed into a single national public carrier, Telefonos de Mexico SA (TELMEX). There are some 108 telephone companies which are now TELMEX subsidiaries which incidentally purchase through TELMEX.

TELMEX, itself is 51% owned by the government. Moreover, the chairman of the board of TELMEX is also the secretary of the Secretariate of Communications and Transport, which further brings TELMEX under government control. SCT in theory regulates TELMEX tariffs, establishes standards for telephone services through the Directorate General of Telecommunications and approves TELMEX investment and expansion. Long haul transmission services are owned jointly by TELMEX and the Directorate General for Telecommunications (70%) owned by TELMEX and 30% owned by DGT). International services are provided exclusively by DGT.

All record services are provided by the Directorate General of Telecommunications through public offices and, in the case of larger businesses, through terminals and line subscribers.

TELMEX is organized into four directorates which report to a General Manager. These directorates are Expansion and Supply, Finance and Administration, Service to Clients, and Planning. The expansion and supply area is in charge of operations, the microwave network (under the supervision of the DGT) and purchasing. Purchasing is divided into exchanges, rural telephone, automatic long-distance, operator long-distance and international long-distance.

Over the past ten years the Mexican telecommunications services have been used extensively as a tool for rural development. Thus, significant sums of money have been invested into the network and it has shown a steady growth rate of 13% or more. Like many rapidly developing countries, Mexico views the telecommunications network in total as a very important tool for the social and economic development of the nation. The current spurt of growth in the Mexican domestic and international network in fact began with preparations for the 1968 Olympic Games in Mexico City and was speeded up with the 1973 acquisition by the government of majority control of TELMEX. Further, like many developing countries, or as Mexico prefers to call itself, evolving countries, plans for expansion of the telecommunications network are being tied to plans for the growth of a domestic telecommunications industry.

Despite this rather rapid network expansion and heavy government investment in telecommunications, service to rural areas in Mexico is extremely poor. As of 1976, only 1,200 of a total of almost 50,000 rural communities had access to telephone service. Moreover, the growth rate and demand for intercity services between large urban areas has been relatively large. This rapid growth in demand presents Mexico with a typical set of problems confronting many evolving nations. That is, should future investment be put into satisfying unmet demand both in quantity and quality of service for interurban services, or should future investment be used to attempt to bring services to at least a part of the large rural population which is without any communication facilities whatever.

Until the Mexican economy turns around, the issue may not be this choice of investment alternatives so much as whether funds are available at all. Already the public sector has announced the cancellation or indefinite postponement of many major investment projects. The fact that Mexico's remaining credit abroad will be used primarily to service the country's huge foreign debt, means that relatively few funds will be available for the financing of any major government purchases.

It is worth noting that the DGT has just announced that during the 1983-85 period it will spend 174 million dollars on constructing 576 microwave repeater stations, 3000 additional telex lines plus a satellite earth station for the Pacific area of the country. Also, 350,000 new telephone lines (through TELMEX) will be provided.

The expected move to digital equipment in microwave use has not yet materialized, apparently on the principle that it is more important to cover the country's requirements fully than to spend money on improving existing facilities.

Service Policies

To date, the service policies of TELMEX have been similar to those adopted by other franchised monopoly carriers. That is, franchised carriers have an exclusive monopoly to provide both services and equipment in their areas of responsibility. Intercity services provided over the jointly owned intercity network are similarly noncompetitive. To date, large users have been allowed to lease private telephone facilities, but, of course, are not allowed to share or resell them. It is our projection that given the demand forecast for interurban and international communications services over the next five or six years, that the Government of Mexico will be forced to adopt policies which preclude future use of private lines in order to more reasonably proportion the existing telephone facilities. Currently, the Government of Mexico has under consideration, as part of its planning for services through the year 2000, the use of additional technologies particularly satellite services to provide additional long haul communications services as well as to facilitate service to rural areas which would be too expensive to serve via traditional terrestrial facilities.

Equipment Policies

While most equipment, with the exception of sophisticated network switches and like equipment, is in fact assembled in Mexico, most of the manufacturers are subsidiaries of large multinational corporations. Three companies--Indetel, Ericcson and GTE--dominate the Mexican equipment industry and provide local manufacturing. The local manufacturers, in fact, supply all the products (non-digital) which are mainly consumed in Mexico and only the most sophisticated equipment is imported again under a virtual monopoly of the three companies involved. These companies which have been established in Mexico for a long time, have foreign participation and, in the case of two of them, also TELMEX participation. They are in an extremely strong position and are very difficult to compete with. Imports of telephone equipment are to a large extent, channeled through these companies and closely monitored by TELMEX, which makes every effort of maximizing the use of locally manufactured products.

In telephone switches and switching systems, the three main suppliers are GTE, Ericcson and Indetel. These companies have been established in Mexico for over 20 years and manufacture small analog (electro-mechanical) local office systems. Such companies also dominate the import market since imports of larger modules (over 1000 lines) or digital equipment are now being channelled through these companies. They supply modular units and practically all the exchanges in Mexico can be expanded in thousand line modules. The average size of exchange is estimated at some 10,000 lines. GTE, Ericcson and Indetel provide office systems in packages and in 1981 the first digital exchange was installed in Telefonos del Noroeste, S.A., a TELMEX subsidiary serving Northwestern Mexico. The decision to convert to digital equipment has now been officially announced but its implementation is still dependent on money factors, given the difficult current economic situation and the size of the investment required.

Indetel and Ericcson supply analog electro-mechanical toll office systems with under 1000 trunks. The electronic systems which have been supplied were imported by Ericcson. Most of these systems are toll, and digital equipment has not yet been used.

The vast majority of PBX purchased in Mexico are analog (electronic) again supplied by GTE, Ericcson and Indetel. These systems have gradually been taking over from the electro-mechanical systems used previously. In addition, a very small number of digital PBX's have been assembled by the same companies though they account for a very small market share.

As regards key systems, these are mainly electronic supplied by Ericcson, GTE and Indetel with the 2 to 7 line models being manufactured locally. Systems with over 7 lines have, until now, been imported. The same companies manufacture secretarial systems locally.

Telephone sets are all manufactured in Mexico by the same companies. Most telephone sets are rotary dial with a few push-button sets now being manufactured. Multi-line sets are mainly up to 5 lines and are again manufactured locally. All equipment which is interconnected with telecommunications network, is provided by TELMEX or DGT. It is unlikely that this policy will change.

Information Processing Policies

Information processing services are a very small sector of the Mexican economy and are primarily located in the main urban areas such as Monterrey, (Nuevo Leon state); Guadalajara, (Jalisco state); Mexico, D.F., metropolitan area, and some of the major border cities as Ciudad Juarez (Chihuahua state) and Tijuana (Baja California Norte state). Moreover, such service vendors almost exclusively provide service on a batch basis as the existing public telecommunications network is, at the moment, inadequate for data communications services. This state of affairs is unlikely to change in the near future. However, the Government of Mexico has, in recent years, adopted certain policies to help foster the development of a domestic data processing industry, including both services and equipment. While this policy is not nearly as well developed as that of, say Brazil, it essentially has the same aim. The intention is to learn from foreign, primarily U.S. high technology but at the same time to reduce the dependence of Mexican firms upon data processing services provided abroad. It is most likely that these policies will in fact become more stringent in the next decade and that Mexico will follow the Brazilian path of increasingly restricting data processing activities offered from outside of Mexico's borders and increasingly requiring that data processing equipment which is to be sold in Mexico be manufactured in Mexico by Mexican owned firms.

Future Prospects and Competitive Access

As was stated in the introduction, Mexico is a nation which in fact must choose between two difficult alternatives. At the same time, it ranks among the leadership of the developing world and has certain strongly nationalistic tendencies when it comes to the development of infrastructures and high technology industries. As a result, in the area of telecommunications services Mexico must choose between spending vast sums of money to provide service to heretofore unserved and extremely poor rural areas. Such facilities will be extremely expensive and the cost of such facilities to those villages with populations in excess of five or six thousand individuals (which represents the minority of rural villages) would cost billions of dollars. At present, only one quarter of such villages have any telecommunications services. However, at the same time, in the demand for international and interurban services particularly data communications services is projected to expand over five hundred percent. Expansion of the existing long distance network to meet these needs would again cost billions of dollars. These facts create a neat quandry for the Mexican Government which requires balancing economic interests, especially the economic interests of large Mexican and multinational corporations, against social interests in Mexico.

Additionally the Mexican Government, like the governments of many developing countries, would like very much to both reduce dependency on equipment manufacturers and service providers located abroad (particularly in the U.S.) and develop domestic industry in a high technology field to create jobs and to improve the quality of its work force. As a result, Mexico, like its sister nations can be expected to increasingly restrict the imports of both telecommunications/data processing services and telecommunications/data processing equipment.

It seems exceptionally unlikely that the Government of Mexico, under the circumstances, having just wrested control of the national telecommunications network from private interests and needing to further invest in the expansion of that network to meet both social and economic development aims, will in any way relax its absolute control over the telephone network or allow any form of competition. Indeed, given the potential of extreme shortage of intercity and international circuits in Mexico it would seem unlikely that the Mexican Government will continue to allow the use of such scarce circuits on an exclusive basis by large Mexican and multinational corporations. Rather, in order to maximize the utility of the existing network, it seems most likely that the Mexican Telecommunications Authorities will require all users to use the public switched telecommunications network. In the area of telecommunications equipment there may, as in Brazil, be some interconnection of private equipment allowed. However, this liberalization of interconnect policies should not overly cheer foreign equipment manufacturers because it is unlikely that Mexico, in the long run, will continue to allow the equipment marketplace to be dominated by foreign manufacturers. Rather, it seems most likely that Mexico will gradually, attempt to force the Mexicanization of existing manufacturers and to require that all telecommunications/data communications equipment used in Mexico be manufactured there.

Little change is expected in the relative importance of the largest buyers in the marketplace. Telefonos de Mexico and the Direccion General de Telecomunicaciones (DGT) will continue to be by far the most important purchasers, probably even more so than in the recent past since one of the effects of the current economic crisis may be to weaken, rather than strengthen the private sector's position within the national economy.

The equipment market situation, characterized by three dominant suppliers and a "buy Mexico" policy, is not expected to change. Although the quality and technological superiority of the U.S.-made equipment is recognized in the Mexican telecommunications market, European suppliers such as Siemens, Ericcson and European ITT subsidiaries are too deeply entrenched in the public sector segment of the market for U.S. suppliers to displace them in the foreseeable future. Thus, competitive access will remain status quo to somewhat less.

PHILIPPINES

Organizational Structure

Telecommunications in the Philippines is predominantly provided by private sector companies under the supervision of a government regulatory commission. Philippine officials point out that the telecommunications industry operates under the concept of "free enterprise" insofar as emphasis is placed on private ownership of operational facilities. This aspect of free enterprise is present. However, new entry and number of service providers are becoming more restricted under a new rationalization policy.

In the past year the government has undertaken a careful review of the telecommunications situation in the Philippines with the intention of developing a rational plan to unify and improve the network. The integration process will take some time but it appears that there will be continued reliance on private carriers, but fewer of them, under a more cohesive regulatory supervision by the National Telecommunications Commission--which in turn is under jurisdiction of a new Ministry of Transportation and Communications.

The system consists of the government and private sectors operating facilities and regulated by the National Telecommunications Commission. The National Telecommunications Commission (NTC) is a quasi-judicial body which regulates the common carrier services performed by the private domestic carriers, international carriers and the carrier's carrier.

The adoption of the new organizational structure of the NTC has enabled it to departmentalize, thus effecting specialization in each field. The Commission, has four departments, three staff officers and presently 11 regional offices.

In the latter part of 1980, the NTC, under the direct supervision of the Ministry of Transportation and Communications (MOTC) laid down its long range development framework plans as follows:

1. to develop and maintain an efficient and economic nationwide telecommunications system;

2. to develop within a medium range time period a self-reliant and integrated telecommunication industry;

3. to achieve effective supervision and control over carriers; and

4. to achieve effective allocation and control of radio frequencies.

The local telephone service in the country is presently being provided by 54 independent telephone companies/operators, with 255 central exchanges operating in 269 cities and municipalities, and providing as of 1 January 1983 about 762,514 telephones in service. The biggest telephone company is the Philippine Long Distance Telephone Company (PLDT) and the government-owned Bureau of Telecommunications (BUTEL). These two presently account for almost 92% and 2% respectively of all telephones. The other 6% is provided by various small private companies and local government agencies.

The domestic telegraph service is handled both by the government and private sectors. There are presently seven (7) domestic record carriers including BUTEL. The private carriers include: Capital Wireless Inc., Clauccilla Radio Systems (CUS), Eastern Extension Australasia and China Telegraph Co., Globe-Mackay Cable and Radio Corporation, Radio Communications of Philippines, Inc. (RCPI), RCA, Telefast Communications.

The international record communications, on the other hand, are handled by 4 carriers operating computerized international message switch centers which are available to almost all parts of the world through satellite, submarine cables and troposcatter system.

International services are provided by RCA Globcom for voice and record, Philippine Communications Satellite Corporation (Philicomsat), Philippine Overseas Telecom Corporation (POTC) and for record services only, Globe-Mackay Cable and Radio Corp.

International traffic provides around 3% of revenues.

Service Policies

The creation of the Ministry of Transportation and Communications has triggered renewed thrusts towards the development of an integrated telecommunications system that will service the entire country. The strategy is toward the integration of local distribution companies for specified geographic areas and to strengthen the structure and capabilities of the existing government regulatory agency to better organize and coordinate the growth of the industry.

The National Telecommunications Commission development program seeks to integrate all telecommunications facilities for domestic services into a single public nationwide telecommunications network to serve the national urban and rural requirements in telecommunications. This will include all types of transmission and reception, at the lowest cost and using the "latest of the art" in telecommunication technology.

Telex and telegraph services will also be integrated nationwide with one private entity and one government entity for telegram and primarily utilizing the national backbone and other facilities for its transmission requirements.

The use of newest digital technology in telephony is being encouraged to obtain the advantages from lower network costs, integrated service capability in the backbone and to guard against the early obsolescence of telecommunications systems by the time these become operational. The planned integrated national backbone shall be capable of handling voice, telegraph, telex and at least 64 KBPs data transmission. And all equipment to be installed shall use the 2.048 MBS digital switch and the 30 + 2 multiplex configuration.

Due to the massive funding and borrowing requirements for the development of the sector, the government will assist in serving the financing for the sectoral programs and projects. The government will, where necessary, invest in the sector and then lease back facilities to the franchise operators. All operations are expected to be financially self-sufficient and be left to the private sector.

Equipment Policies

There is little indigenous equipment manufacturing, hence most sophisticated equipment is imported. However, the market is quite small and growing very slowly. All equipment is provided on a leased basis by carriers. This is not likely to change with the ascendency of PLDT to quasi-monopoly status.

With the new government programs, investments in progressive local manufacturing facilities for exchange, instruments, terminals and other telecommunications equipment will be possible and will be encouraged. The pursuit of supportive manpower development programs will be continued by upgrading and strengthening the capabilities of telecommunications Training Institute of the Bureau of Telecommunications (BUTEL).

Information Processing Policies Under Study

Future Competitive Access

The existing international carriers have developed close relationships with their U.S. counterparts. No near-term changes in this structure are anticipated. Similarly, procurement arrangements between Philippine companies and U.S. firms or their Philippine subsidiaries are well established.

Domestic services will see fewer carriers and service providers, not more, due to the new integration and rationalization process.

Equipment market channels will be affected (reduced) by fewer carriers. If equipment continues to be tied to the service provider, this would result in a less open situation. Access to this segment will also be influenced by, as yet an unclear local manufacturing policy.

SINGAPORE

Organization Structure

Singapore is the world's second busiest port, second largest petroleum refining center, regional entrepot for South East Asia, an important site for foreign investment in manufacturing, a regional parts distribution center and a regional financial center. Therefore, Singapore must have a modern communications system to support its activities. It is already an important world center with telephone service to 207 destinations.

The Telecommunication Authority of Singapore or Telecoms, as it is called, incorporated on October 1, 1982, is the overall authority to provide and operate both the internal and international postal and telecommunication services. It is the licensing authority for all postal and telecommunication operations and serves also as an adviser to the Government on telecommunication matters. Customer-owned telecommunication equipment must also be revised and type-approved by Telecoms.

Telephone Service

Since 1973, telephone service demand has grown at an average annual rate of 13%. In the 1981/82 period, a total of 86,323 applications were received compared with 36,457 in the 1973/74 period. Last year, Telecoms was able to offer service on demand to about 92% of the applicants. Of the 8% or a monthly average of 570 applicants who were not offered service on demand, 53% of them received service within 3 months, 32% within 3 to 6 months and 16% within 6 to 12 months. No applicant had to wait longer than 12 months. At the end of 1981/82, the number of deferred subscribers was about 2,800 or 0.5% of the network size.

Currently, the telephone network in Singapore is served by a fully automatic system of 25 exchanges with a total capacity of about 891,900 lines (as of 30 November 1982).

Of the 891,900 lines of switching equipment, 19,900 are step-by-step, 464,000 are common control crossbar and 408,000 are space division electronic stored program control. The SPC lines were contained in two pilot exchanges which were introduced early in 1977 to provide Telecoms with programming experience and to enable initial training programs to be set up. The two exchanges, each of 10,000 lines are a Fetex 100 system from Fujitsu Ltd. of Japan and a Type 10c from Bell Telephone Manufacturing Co., Antwerp, Belgium. By early 1983, a total of 400,000 SPC lines based on the Hitachi Ltd., Tokyo, Japan, D10 system would have been installed to replace all step-by-step and some crossbar exchanges as well as to provide for new demand. The end of 1982 saw the beginning of full scale introduction of the local digital switching equipment from Fujitsu Ltd. of Japan. A total of 411,000 lines are scheduled for installation over the next five years.

Today, more than 70% of the telephones in the network are of the push-button type. All telephones in the network will eventually be replaced by push-button ones.

As of the end of November 1982, there were over 890 automatic landmobile telephone sets and 270 harborcraft sets in operation. A new cellular mobile telephone system was recently commissioned to expand the existing landmobile telephone system.

A Computer Access Service (Telepac) provides subscribers with access to computers and data bases in 6 destinations (Belgium, Canada, Switzerland, United Kingdom, United States and West Germany).

The radio paging service currently has over 19,000 pagers subscribed for. More facilities will be available when a new computer-controlled automatic radio paging system with a capacity 100,000 addresses comes into operation in 1983.

International Facilities and Services

International telecommunications is a key factor in Singapore's continuing success as a business and financial center. As of the end of 1982, international telephone service was available to 207 destinations with IDD (International Direct Dialling) available to 116 of these destinations. International telephone calls increased by 43.2% in 1981/82 to about 5.5 million calls, compared with 3.8 million in 1980/81.

Singapore ranks fourth after the United Kingdom, Australia and Canada in terms of telecommunications traffic generated from Commonwealth countries.

As of September 1982, Singapore operated two international telephone gateways, one crossbar and one SPC, with a total equipped capacity of 1,805 international trunk lines. The number of connected international trunk lines inclusive of the lines was 1,083. These exchanges provided IDD services to 113 destinations and number-to-number international telephone service to 140 destinations. The total number of destinations with which Singapore has international telephone service was 207. The SPC exchange will be expanded by 1,200 international trunk lines in 1983 to meet the growing demand of international telephone service and to absorb the crossbar international gateway exchange. A new digital telephone gateway exchange is scheduled to be commissioned in 1986/87.

Singapore initiated international satellite service in August 1971 with the completion of her first earth station antenna at Sentosa. A second earth station antenna also at Sentosa was put into operation in 1974. With these two antennas, Singapore can communicate with the rest of the world through the INTELSAT satellites situated above the Pacific and Indian Oceans. Regionally, Singapore is one end of a microwave link to Peninsular Malaysia with 2,700 channels installed. A 504-pair junction cable with 5 PCM system linking Singapore with Johore Bahru acts as the back-up to the microwave system.

Singapore has become an important submarine cable hub in South East Asia. The South East Asia Commonwealth (SEACOM) submarine cable system which links Singapore to Kota Kinabalu (Sabah, Malaysia), Hong Kong, Guam, Madang (Papua, New Guinea) and Cairns (Australia) came into operation as early as 1967 and is still operating satisfactorily. An ASEAN Submarine Cable Network was implemented in cooperation with the other ASEAN partners. Today, this cable network consists of the ASEAN Philippines-Singapore cable (completed in August 1978), the ASEAN Indonesia-Singapore cable (completed in April 1980) and the ASEAN Malaysia-Singapore-Thailand cable (completed in December 1982). The ASEAN Philippines-Singapore cable, a joint project of Eastern Telecommunication Philippines Incorporated (FTPI) of Philippines and Telecoms of Singapore, will be capable of interconnecting with the OLUHO undersea cable at Luzon and provide much needed cable circuits between Hong Kong, Taiwan, Japan and Singapore.

Three new inter-regional submarine cable systems are being planned to connect Singapore to:

1. North Asia (Singapore-Hong Kong-Taiwan)
2. Australia (Singapore-Indonesia-Australia)
3. Middle East and Western Europe (Singapore-Medan-Sri Lanka-Middle East-Western Europe)

These cable systems are expected to be completed in 1985/86.

Maritime communications has been enhanced on 1 November 1982 with the commissioning of a coast earth station that works to the Pacific Ocean Region satellite of the International Maritime Satellite Organization (INMARSAT). Telephone, telex, telegram, data and facsimile services are offered through this coast earth station.

Telex

As of September 1982, there were 11,791 telex subscriber lines in Singapore. The international telex service is available to 198 countries, of which 166 can be dialed directly by the subscribers (as of December 1982). The telex network consisted of one crossbar exchange and two SPC exchanges with a total equipped capacity of 15,540 subscriber lines and 2,140 international trunk lines. The number of telex subscriber lines increased by 26% in the financial year 1981/82 and the international telex calls increased by 29.6% to a total of 10,149,405 calls. Singapore's telex penetration was approximately 4.3 machines per 100 population in 1981/82. Two new national cum international telex exchanges are targetted to be commissioned in 1984 and 1985. These two new telex exchanges will absorb the crossbar telex exchanges and the technically obsolescent SPC telex exchange installed in 1974.

Two additional telex facilities, namely the Departmental Billing and Private Telex Network were introduced in December 1982.

Network and Service Expansion

A number of new services have been provided for customers. These include:

1. The remote Computer Access service made available via the packet switching system. This is in support of the rapidly expanding computer communication as well as other data communications requirements. This service also allows subscribers access to computers and databases in Belgium, Canada, Switzerland, West Germany, United Kingdom and the United States.

2. A private network message switch system with a capacity of 256 ports providing sophisticated facilities and features for large corporations to establish their own private network.

International data service (Datel) is available to 26 destinations as of December 1982. Telefax is a low, medium, or high-speed facsimile service either via IDD, with operator assistance through the public switched telephone network or by leased circuits. As of December 1982, it is available to 26 destinations. This service is also offered from Telecoms' Customer Services Centres on an administration-to-administration basis to 25 destinations.

New developments in the pipeline are:

1. An integrated tele-metering, tele-alarm and tele-control system which can provide integrated services for remote reading of public utility meters, remote surveillance of burglar and fire alarms for households and remote switching of home electrical appliances, using the existing telephone network. The trial system has been jointly developed by Telecoms and manufacturer. A field trial has been launched in 1982.

2. A multi-access travel reservation system which allows travel agents direct access to reservation computers of airlines through the use of a single visual display unit.

3. Teleview, Telecoms' version of interactive viewdata system for disseminating and retrieving computer-based information using the telephone lines for communication and the home television set for display.

A trial audiographic teleconference service was introduced between Singapore and Indonesia in September 1982. The service enables two groups of people who are geographically apart to participate in a meeting without having to gather at a common location. Both voice communication and graphic facilities are available.

Telecoms, in recognizing the important role and potential of optical fibers, initiated its first optical fiber field trial way back in 1976, jointly with Fujitsu Ltd. of Japan. The 4.2 km optical fiber trial system was commissioned on 14 February 1977 to carry "live" telephone traffic between two local telephone exchanges as part of the junction network of Singapore, putting Singapore ahead of a number of other claimants to have been the first to carry "live" traffic over optical fibers in the public telephone network.

With the success of this field trial, Telecoms plans to introduce a multi-purpose optical fiber cable network in 1983/84 to provide high-capacity junction links between telephone exchanges. This network will also provide the inland link for new subscriber cables such as the one planned between Medan and Singapore and a diversity link for microwave communication between Singapore mainland and the satellite earth station on Sentosa Island.

Gradually, from the junction network, Telecoms will next extend the application of optical fibers into the local subscriber network to provide an overlay optical fiber wideband network over the existing copper telephone cables. Realizing that to use optical fibers simply for the provision of telephone service alone is not economically viable, Telecoms has been looking at possible new services which can be piggy-backed on the same optical fiber wideband network and thus justify the introduction of a complete optical fiber network throughout the Republic. Based on the integrated services concept, the optical fiber wideband network will make available, besides the basic communication requirements, broadband channels which are needed to provide cable video services island-wide.

The availability of broadband facility via the optical fiber wideband network would open the radio frequency bands currently occupied by the VHF/UHF transmitted services. This would mean the possible removal of thousands of roof-top Yagi antennas and result in better technical quality of service and greater number of potential channels available.

The capital investment for these and other future planned projects and services is being financed from internal sources with the exception of a $13.75 million United Kingdom export credit for financing Singapore's share of the Philippines-Singapore submarine cable and $12.25 million Nippon Electric Company supplies credit for financing Singapore's share of the ASEAN Indonesia-Singapore cable.

SWEDEN

Organization Structure

Sweden's telecommunication system is operated by the Swedish Board of Telecommunications or Televerket (TVT). TVT employs a staff of 43,000 and is organized with a central administration and 20 local operating units, each with a high degree of autonomy.* Televerket is a government-owned public service corporation through the Ministry of Transport and Communications to the Swedish Parliament. Televerket has the responsibility for providing telecommunications services in the areas of telegraph, telex, telephony, data communications, radio communications, and alarm systems services in the national and international fields.

Under a mandate by the Swedish Parliament, Televerket revenues should defray actual operational costs and depreciation, and a portion of any surplus shall be returned to the Treasury corresponding to the interest costs for that part of the national capital which is invested in telecommunication facilities or plants.

There is no connection in Sweden between the functions of posts and of telecommunications. There has never been one. The introduction of the telegraph 130 years ago (1853) was the occasion for the start of the present telecommunications administration. However, there does exist a structure for coordination of joint efforts by posts and telecommunications, such as that for business services, e.g., Post-Fax.

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*On 1 April 1975, the organization of Televerket was changed through a process of decentralization. The motive was to increase operating efficiency and to delegate more decision-making functions to the local units. The work of the Central Administration was reduced considerably.

Since no particular Government Minister or Ministry* controls the Administration (it acts like a British Crown Corporation), it is Televerket's Board which reviews the operation of TVT. The Board is composed of two members from industry, a member from the academic field, two members of Parliament, a staff representative, and the Director-General of TVT (who is the Board's Chairman).

A new telecommunications bill stipulates that Televerket's competitive activities should in principle be carried out in separate subsidiaries. Where this is not the case, it is required that competitive services be separated from non-competitive in the accounts. The reason for this is that competitive activities should not be subsidized by monopoly activities.

Some activities have already been transferred to subsidiaries. An alarm services subsidiary was formed in 1982 and all manufacturing activities are scheduled to be transferred to an industrial subsidiary before 1985. In order to improve the possibilities for the subsidiaries to act with swift and commercial efficiency, a holding company, TELEINVEST AB, has been created for Televerket's company sector.

Televerket, itself, has also been given increased possibilities to act commercially. To this end a special state credit has been put at Televerket's disposal for financing certain electronic terminals. This credit enables Televerket to offer leasing contracts to its customers in the same way as private suppliers. Televerket, like its competitors, is subject to the general Swedish legislation forbidding restrictive business practices.

The Bill recognized the importance of Televerket participating in the terminal market. In this way it will be possible to make the correct balance between investments in the network and in terminals. The Bill also stressed the value and importance of Televerket serving both the business and the residential markets. Services primarily developed for the business sector may later diffuse to and directly benefit the residential sector as well.

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*In the Sweden governmental system, a Ministry does not interfere directly with routine administration. It is a staff organ for policy planning, introducing legislation and the like.

Telecommunication Service Policies

Service responsibilities within TVT are split between telecommunication services and radio operations.* TVT's telecommunications services are provided through the combined effort of the 20 local operating entities and central administration departments. Important central administration departments include the Marketing, Network Planning and Corporate Planning departments. The Marketing Department is responsible for long-term development of services; acts as a consultant for the regions; and is concerned with customer policies. The Network Planning Department is responsible for planning the telecommunication networks. The Corporate Planning staff coordinates the administration policy and planning and maintains the interface with the Ministry of Communications and other authorities on policy issues. It does not concern itself with the operation of the telephone areas which are autonomous profit centers.

The broad outline of the Swedish national telecommunications policy has recently been defined by Parliament when a new telecommunications Bill was adopted in late 1980 with wide political support. The present policy is to encourage the increasing market orientation of Televerket and to emphasize the important role Televerket has to play in introducing modern information technology in Sweden. The responsibility for policy-making within the frame set by Parliament and the Government is delegated to Televerket. Decisions made by Televerket can, however, normally be appealed against to the Government.

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*The Radio Services form the second part of Televerket's operations. Cooperating with the Swedish Broadcasting Corporation, this unit maintains and develops the sound radio and television broadcasting operations, under control of the Government and Parliament. It conducts coastal and ships radio operations; provides radio circuits for telecommunications needs; provides mobile land radio communication and information systems, and radio engineering services for civil aviation; allocates and regulates radio frequencies; prepares all necessary technical and economic long-term planning; develops systems and technology; performs technical rationalization and marketing services within its sphere of influence; and acts as consultant to other units of TVT and external clients on a fee basis. The unit consists of a Radio Department and six geographical Radio Areas.

The formal instruments regulating telecommunications services in Sweden are the telephone regulations and the telegraph regulations issued by the Government. There is no legal monopoly in providing telecommunications services in Sweden. Rather, Televerket can be said to have a de facto connection monopoly since Televerket operates the publicly owned networks and decides what types of equipment may be connected to these networks. According to the telephone regulations the rules for connection of equipment to the public telephone network and use of private leased circuits are set by Televerket. Foreign suppliers are subject to the same rules for connection of equipment as domestic suppliers.

A fundamental element in Swedish telecommunications policy is to provide basic telecommunication services as public services. A public service should satisfy the following conditions:

- Maximum interworking with all parties connected to the service.
- Up-to-date and reliable directory information to the public.
- Very high availability and technical quality.
- Maximum international interworking.
- Maximum interworking between different generations of equipment and "exchangeability" between generations.
- Uniform charges throughout the country.
- Uniform quality of service throughout the country.

Telephone Service

Telecommunication has reached a very high level of development in Sweden and plays an important role in the country both from economic and social points of view. Measured in total number of telephones per thousand of population, Sweden ranks second in the world.[*] 99% of all households in Sweden have telephone installations. Inland telephone traffic is 100% subscriber-dialed, and international traffic over 90%. In terms of population, however, (8,315,000 on 31 December 1980) Sweden is close to the saturation point in installations.

Sweden's high telephone density is due to several factors. A substantial part of the telephone network was automated at an early stage. A policy of strict standardization of the technical equipment was pursued and high demands were placed on reliability in operation and low maintenance costs. The telephone rates have been kept at a low level and the price for the installation of a telephone has been the same for all subscribers wherever in Sweden the telephone is installed. Also, as a general rule, TVT strives to keep tariff charges below the cost of living index by 5% (an internal target within TVT) in consideration of the price-elasticity of demand. By keeping prices low (lower than in most other countries), TVT has geared itself to high telephone density and volumes high enough to permit self-financing of investments.

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[*] AT YE 1982, the number of telephones was 7.3 million corresponding to 864 telephones/1000 of population.

The telephone service, the largest branch in the Administration, accounts for 85% of the total revenue (1979-80).

Expansion of telephone services is expected to be at the rate of 2%/year and of telephone units at the rate of 20%. Cordless units are not available at this time from Televerket but other type-approved peripheral accessories may be installed directly by the subscribers.

Modernization of the telephone exchanges started in 1980 with replacement by the AXE digital stored-program-controlled system; a task which will take many years to complete. At the same time, the Administration has also introduced new digital PBXs and terminals in line with new demands for data and text transmission. With these improvements, nationwide 64 Kbps service will be possible with selective capability to 2 Megabits.

Telex Service

The Swedish telex network has over 16,900 terminals at YE 1982. The subscriber growth rate is 6% per year, down from 10% in the 1970s, and 70% of all traffic is with foreign countries. The rapidly growing traffic calls for better efficiency of the system. Therefore, the network has been modernized by means of a new fully electronic, stored-program-controlled switching system developed by Ellemtel, and terminal features have been upgraded. TELEX 080 service was introduced in 1980 to permit storage and forwarding of messages to busy numbers, using Mutex equipment developed by Ellemtel.

TELETEX

TELETEX is a new service introduced in 1982, providing access both to the international telex network at the usual speed (50 baud), and to the public data network (DATEX-L) at 2.400 kbit/s. As TELETEX provides full text processing, communication memory to memory and other advanced features, it is assumed to gradually replace conventional telex. TELETEX terminals are provided by Philips and Ericsson, with other suppliers planning to connect via the DATEX network.

Telex is a public service, where Televerket has sole responsibility end-to-end for both the network and the terminals. The new public TELETEX service is however introduced as a competitive service utilizing the public data network and interworking with the telex network. In consequence and according to Televerket's rules, TELETEX terminals from any supplier can be connected to the data network. After a technical transition period, interworking between Televerket's TELETEX or telex terminals and privately supplied TELETEX terminals will be possible.

Data Transmission Service

Data communication in Sweden has been constantly growing, a fact reflected by the sale of modems--the number of new installations in 1982 was 9700, an increase of 25% over the previous year. As of the end of 1982, there were approximately 50,000 modems installed, ranging from 300 bps to 9600 bps in transmission rates. (Apparently, the highest density of modems in Europe).

Televerket offers data communication services both as public network services and via leased private networks. At this time, there is no intention of directly restricting the latter. Nonetheless, there is a preference for common use networks and, thus, indirect attacks on private networks may be expected through public data network services and tariff policies.

The Swedish Public Data Network Service (PDNS), renamed DATEX-L, was inaugurated on 1 September 1981. Initially, the network comprised equipment for about 4,000 subscribers (about 500 connections were installed as of 1 October 1981) with 10,000 today and expectations that that number will increase to 14,000 by 1985. DATEX-L is so structured as to permit traffic with the other Nordic countries as will be DATEX-P.

DATEX-P is a packet-switched PDN which will be introduced in 1984. A large part of data communications will pass through the PDNs in the future. However, it is not intended to supersede the telephone network as a data-communication medium since the customer has the ultimate choice.

The other public data network is TELEPAK. This is a packet switched network, at present with one node in Stockholm and multiplexors in Gothenburg and Malmo. TELEPAK is primarily intended to provide access to various databases in Sweden, Europe and the USA. TELEPAK service is also offered for other applications than information retrieval. The equipment has, however, limited capacity and a full fledged packet-switched network is planned for 1984, the DATEX-P network.

Satellite Communication Services

The Swedish Telecom Administration is participating in INTELSAT, INMARSAT and EUTELSAT, providing for international voice and data communication. Thus, the present joint Nordic INTELSAT earth station in Tanum at the west coast of Sweden will be upgraded for TDMA transmission by 1984, providing 2 Mbit/s and 64 kbit/s transatlantic links for data and video.

Also, in 1984 the first operational European Satellite (replacing the Orbital Test Satellite already in orbit) will provide Swedish customers a package of business communications services including 2 Mbit/s and 64 kbit/s digital links to other European countries.

A proposed satellite service for TV program dissemination, originally named "NORDSAT," has been abolished and replaced by the concept of a multipurpose satellite carrying both TV and data transmission transponders. The new proposed service, named "Tele-X", is regarded by some as being more in the light of a satellite communication aid to industry. This system could be available by 1986 or 1987.

Tele-X is an experimental satellite, still in the design stage. It will carry transponders for data communications at megabit rates (to be received by small dish antennas) and two TV-channels. The experiments include wave propagation tests in the 20-30 GHz range. TVT is conducting these experiments in conjunction with the Swedish Space Corporation Projected cost is 1.2 billion SKr and a launch date is set for 1986/87. It is noteworthy that Norway and Finland have expressed an interest in actively participating in this project. There even have been political discussions on the possible extension of Tele-X into a three satellite, fully operational system carrying five TV channels, for use within the Nordic countries. Norway has recently joined in the Tele-X project.

Facsimile Service

Facsimile service, using Group 2 terminals, was initiated in 1980, and now serves approximately 2500 subscribers. Accepance of the service has been greater than anticipated. During the third quarter of 1982, TVT introduced Group 3 terminals for faster service. Suppliers of terminals are Nippon Electric Company (Group 2) and Matsushita (Group 3).

Electronic Mail Service

Televerket provides Teletex and (described earlier) digital fax (gr. 3). In addition the networks support the use of DATAVISION (Viewdata/Videotex), a number of privately run mailboxes including the PLANET and EEISS system in the US, etc.

Viewdata Services

In Sweden, Viewdata is called DATAVISION. It started commercial operation in 1982 having approximately 1,000 business users at the end of the year.

The activity of Televerket is limited to the provision of the network services, gateways, etc. A number of separate companies are assumed to act as information providers, having independent commercial and legal responsibilities. At present, year end 1982, three companies are acting as information providers:

1. TELEBILD AB, mainly owned by private industry and
2. POSTEL, owned and operated by the Swedish Postal Administration and
3. Viewdata AB, providing access to international databases.

(The services are directed to business customers only, not only for legal reasons, but also because no viable residential market is expected for the next few years. However, TEXT-TV, a simpler and cheaper service of CEEFAX/ORACLE type has been launched by the Swedish Broadcasting Corporation and has gained some success.)

Teleconferencing/Videoconferencing Services

Teleconferencing services have been offered since 1979 and there are presently studios in Stockholm, Gothenburg, Malmo, Norrkoping, and Lulea. These will be expanded with the coming of high rate digital services and satellite multiservices.

The introduction of Megabit-services on satellites from 1984 onwards is assumed to provide more momentum to the use of videoconfercing with access to European and transatlantic connections.

Automating the Office

The Administration has examined both the PABX-control technique and the Ethernet with coaxial cable technique. Data-communication by (digital) PBX has already been launched as a commercial service, presently with speed up to 19.2 kbit/s at the end of the year.

Sweden Coordination with CEPT and CCITT

The Swedish Administration is a strong supporter of European and international standards and coordination of services and policies through their active participation in CEPT and the CCITT.

Leased Circuits - Private Networks

Voice communication networks, based on circuits that are not operated by televerket, are allowed without any restrictions but may not be connected to the public telephone network. Such separate networks have been developed, e.g., by the State Railroads and the State Power Authority. More common are, however, private networks using leased circuits from Televerket. In accordance with the relevant CCITT recommendation Televerket does not allow third party sales of services on such networks.

Leased circuits nationally are provided by Televerket and internationally by Televerket in cooperation with the remote end telecommunications providers.

The same conditions apply to the connection of equipment to leased analog circuits as apply to the connection of equipment to the public telephone network. Interconnection of leased circuits to the public telephone network as well as the general use of leased circuits is governed by CCITT recommendations D1 and D2 and by the recommendation CEPT TP GT 10. Televerket does not allow shared use and resale of capacity on leased circuits.

DATEX-L is actively promoted as a new alternative for data communication which will be technically and financially advantageous for many users, in particular small ones. Televerket will encourage users to switch to DATEX-L by giving information about the economic and technical advantages and by introducing new services primarily on DATEX-L. Televerket will not, however, force users of leased circuits to switch to DATEX-L by making any non-cost-related changes of the relative rates of leased circuits and DATEX-L.

Equipment and Interconnection Policies

In the late 1970s it became evident that there was a need to clarify Televerket's policies on connection of equipment to the public telephone network. This was mainly a consequence of the rapid technological development which made available a whole range of new products and services based on electronics. In adopting the 1980 Bill, Parliament supported a clearer and somewhat liberalized connection policy of Televerket explicitly limiting the connection monopoly to the public telephone network and the telex network. For connection to the public telephone network or to leased lines the monopoly was limited to

- equipment for voice communication,
- modems for speed over 50 bps (excluding acoustic modems up to 300 bps).

Voice communication is here defined as direct information exchange in spoken form between human beings. Thus, telephone answering machines are not part of the monopoly. Inside the monopoly are all sorts of telephone sets as well as PABXs. The main reasons for maintaining a monopoly are not technical but economic, social and regional policy considerations in order to maintain voice communication as a truly public service.

The new telecommunication Bill also indicated that Televerket should be prepared to revise its connection policies if changed conditions motivate it, in particular its policies on connection of modems. Televerket is therefore following closely the technical development, e.g. on built-in modems. Very recently, a decision has been made to liberalize the supply of certain modems (up to and including 300 bps full duplex, 1200 bps semi-duplex and 1200/75 bps). This decision takes effect as of July 1, 1983 and includes built-in as well as separate modems.

In Sweden private equipment can be connected to the various public networks operated by Televerket. Restrictions apply only to the public telephone network where equipment for voice communication and certain modems are reserved for supply by Televerket and to the telex network where Televerket reserves the right to supply telex terminals and switches. Other privately supplied equipment may be connected to the public telephone network and other public networks such as the data networks and the mobile telephone networks.

Type Approval

According to the 1980 Bill new stricter procedures for certification of privately supplied equipment have been introduced. The new procedures are as follows.

Connection of privately supplied equipment is subject to type-approval, which is handled by a separate department of Televerket. The applicant has on request a right to total confidentiality concerning both application including documentation and test results. Charges for type approval are set so as to cover Televerket's costs. Applicants shall provide Televerket with the necessary documentation, such as drawings and descriptions to make it possible to judge whether the product satisfies the conditions for connection. This screening of documentation is usually sufficient for handling applications concerning connection to the modern networks, such as the data communication networks, where the interface of the network is well defined. In this case the type-approval procedure is limited to a check of the specification of the network interface of the equipment.

Applications for connection to the less well-standardized public telephone network has to be handled more thoroughly. This network has been constructed over a long period of time and is to a large extend primarily designed for the requirements of voice communication. In addition to drawings and specifications the applicant may in these cases have to provide Televerket with a set of the product or its communications interface for testing. Televerket makes a preliminary screening to ascertain that the product does not lie within Televerket's supply monopoly sector. If it does the product will not be tested any further. Such a decision not to test the product can be appealed against to the Director-General and then to the Government if the applicant so wishes.

If the product does not lie within the monopoly sector it shall be tested. In this case the type approval process may also include field tests against various types of switches and connections for equipment operating actively with the network, such as automatic diallers. The test shall ensure that the equipment will operate without causing harm anywhere in the not so homogenous network. This procedure, however, applies to a less dynamic and probably shrinking part of the terminal market. Within 10 years, as the public telephone network evolves into an ISDN (Integrated Services Digital Network), it is expected that all type-approval can be limited to the simple procedure of screening interface documentation.

There was some discussion preceding the 1980 Bill regarding the responsibility for type-approval. It was decided that technical testing should remain in Televerket as design and execution of relevant tests of equipment outside televerket would require costly and inefficient duplication of Televerket's resources in this area.

Equipment Procurement

Televerket requirements are met in either of two ways:

1. By development within Ellemtel and subsequent production by Teleindustrier AB (TELI) or TEFAB, or

2. Development of specifications and request of tenders worldwide. Most of its equipment needs are provided by its own manufacturing arm, TELI, or its preferred domestic supplier, L. M. Ericsson, who works with TVT jointly through Ellemtel, a joint research and development company

Televerket Manufacturing--TELI

Teleindustrier AB [TELI for short] is the Administration's industrial facility with main offices in Nynashamn and factories in Nynashamn, Sundsvall, and Vanersborg. A subsidiary, limited liability company Telefabrikation (TEFAB), wholly owned by the Administration, has two factories.

The prime responsibility for TELI is to supply to the Administration the public and private exchange equipment and subscriber sets required for Sweden's services. Also included in the product range are alarm, data processing, and air traffic control equipment. Product development for TELI is done in most part by Ellemtel, the development company jointly owned by Televerket and L. M. Ericsson.

Employees at TELI numbered 3,700 as of January 1982. Its sales was 1,260 millions up 30% over the previous year.

Televerket R & D

Televerket supports research in several ways but a principal outlet is via Ellemtel.

Ellemtel

Ellemtel Utvecklings AB is owned equally by Televerket and L. M. Ericsson. It was formed in 1970 to combine the common experiences of the two shareholders, in order to design and develop equipment in accordance with mutually-accepted directives. There are approximately 700 employees involved in such tasks as the development of digital subscriber equipment for the AXE family, Mutex telex equipment which provides store-and-forward techniques for messages headed for a busy terminal and functional and system testing for equipment destined for the Nordic PDN (Public Data Network).

The Swedish Administration's Technical Department comprises about 1000 people engaged to some extend in research and development which relieves the Administration from full dependence upon the work at Ellemtel. For example, the staff worked with Noethern Telecom to convert the SL-1 digital exchange to CCITT standards. The resultant product has been installed in approximately 50% of the potential Swedish locations. Since that development, a full line of digital PABXs has been developed, including a potential successor to the SL-1.*

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*This time with the participation of Ericsson staff (within Ellemtel).

Also developed within Ellemtel was the AXE exchange which has been marketed extensively worldwide (to 44 countries) by L. M. Ericsson and produced for domestic use by TVT factories.

Even the telecommunications equipment manufacturers in Sweden have found themselves at times actively competing with the Televerket manufacturing subsidiaries. There are, however, a number of areas in which Swedish manufacturers have developed solid supply relationships with TVT. The net result is that, although not a closed market, there is not a large available market open to foreign producers, that is, open to import. The import ratio of Televerket's procurement of telecommunications equipment is approximately 10-15% , considered relatively high by European standards.

The customer equipment market segment represents a more (relatively speaking) available market for those suppliers and equipments type-approved by Televerket. TVT also provides interface devices between this equipment and the network. The Swedish Data Processing Wholesalers Association (LKD)* has been lobbying for more liberal authorization of private interconnect suppliers so that they can compete more broadly and equally with Televerket and for type-approval by an independent (non-TVT) authority.

Sweden/Nordic Joint Communications

Sweden is an important participant in the Nordic communications projects. The Nordic nations include Denmark, Finland, Iceland, Norway and Sweden. The Nordic nations maintain a cooperative approach to a number of telecommunications services. As an example, international satellite communications to the Nordic area are funneled through an INTELSAT earth station located in Tanum, on the west coast of Sweden, thence by radio and cable relays to the ultimate destination. The cost of the operation is apportioned in accordance with the amount of traffic in and out of each nation. No language problems in operation are encountered since most of the operators speak a mixture of Nordic tongues (Scandinavian--a non-official language).

The Nordic Public Data Network (DATEX-L) and the NMT are examples of joint Nordic service planning.

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*Leverantor Foreningen Kontors--Och Data Trustning.

Shortly after the Swedish "Databas 300" service was inaugurated to the United States (March 1980), for access to the American TYMNET and GTE Telenet data networks, a trial project named SCANNET was initiated which involves Swedish and Nordic host computers in the service. The Swedes had planned, also, to interconnect with packet-switched Euronet and this should come to pass before the end of 1983. From 1983 or 1984 on, Swedish customers also will have access to the European Communication Satellite at capacity rates up to 2 Mbps. Within Sweden, users will have options to access 64 Kbps transmissions by 1984 or 1985.

Sweden, in conjunction with the other Nordic PTT administrations, has initiated an inquiry among U.S. international carriers as to the possibility of entering into an operating agreement with one of a limited number of carriers, for services carried by public data communication networks between the U.S. and the Nordic countries. Excluded are services provided over the PSTN or telex networks.

Sweden is proud to point out their early introduction of cellular mobile radio as well as its commercial success. The Nordic Mobile Telephone System (NMT) also exemplifies the cooperation between Denmark, Finland, Norway and Sweden for both social and economic (increase economies of scale) purposes.

Televerket's position as dominant supplier in Sweden is credited with early success of this service. TVT feels if the market had been fragmented and shared by several companies, this development would not have been undertaken.

Teleinvest AB*

Teleinvest AB is the holding company for a number of subsidaries, with separate accounting ("arm's lengths") from the rest of Televerket Group.

It was created by a Parliament Act on Telecommunications Policy in 1980 in order to keep a clear borderline between non-regulated and regulated activities of Televerket.

The activities of Teleinvest is still limited in size, an important aspect, however, being its ability through the subsidiary TELEFINANS AB to attract financing from commercial markets.

The regulated activities of Televerket is self financed to almost 100% out of current revenue, still enabling Televerket to keep tariffs at rates at about half the level of most European countries.

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*"AB" means Inc.

The issue of establishing Televerkets factories (TELI) as a subsidiary of TELEINVEST AB is still pending in Parliament.

Besides Telefinans AB, SWEDTEL AB and SWEDCOM AB the holding company is comprised of a number of small subsidiaries and comprised of minority shares of other entities.

The SWEDTEL and SWEDCOM subsidiaries of Teleinvest AB assist Sweden's participation in world telecommunication markets.

SWEDTEL AB

Swedish Telecoms International AB (SWEDTEL) is a consulting organization, wholly owned by the Swedish Administration. It conducts consulting work in telecommunications mainly in developing countries. The consultants, in most part, are personnel on loan from the Administration. During 1979-80, a total of 54.6 million Skr was invoiced; a total of 197 employees were engaged in work abroad on 1 January 1980, and 24 employees staffed the main office. During the spring of 1980, an agreement with the Swedish Post Office extended SWEDTEL's activities into the postal field.

SWEDCOM AB

Swedish Telecoms Contracting AB (SWEDCOM), formed in 1980, is directly concerned with the installation, operation, and maintenance of telecom equipment in foreign countries, working closely with SWEDTEL. SWEDCOM exports material manufactured by TELI but there are some restrictions because of its supposed cooperation with L. M. Ericsson, through the mutually-owned subsidiary, Ellemtel.

Information Processing Policies

In general, in Sweden as in many other European countries, a very strict border-line exists between network and content. Consequently, nobody in TVT really cares about the content. TVT does not regulate information processing. Other government entities may and do monitor and regulate certain information activities. These entities may seek cooperation from TVT. The transmission of data across the Swedish border is subject to Swedish privacy protection law.

For example, during preparations for the Nordic Data Network, TVT was apparently approached by the Swedish Data Inspection Board for protection of personal data and to determine how the network would interact with other countries. This has resulted in some measures brought about by agreement with the Board which provide that data bases containing personal data will be permitted interconnection with the network but under voluntary controls, to assure that private data are not released internationally.

In brief, the mission of the Data Inspection Board is one of an OMBUDSMAN, assumed to protect citizens from any abuse of personal data, including possible abuse stemming from the Swedish Government. In fact, the Board is presently publicly protesting the Government's plans to give tax authorities the right to cross reference personal financial data, stating that personal integrity might be violated by the taxmen.

Thus, the Data Inspection Board is publicly concerned about any use (possible misuse) of personal data, whether it is domestic or international or whether telecommunication is involved or not. The Data Inspection Board as an independent body is not necessarily in agreement with the Government views - having personal ingegrity as their star of navigation.

A consequence is that the Data Inspection Board has nothing especially to do with datacommunication, which network (public or not) is used, etc.

User Influence

There does not exist in Sweden a user organization which represents the residential subscriber. There is, however, a business-oriented organization--the Telecommunications Committee of the Federation of Swedish Industries (NTK)--that meets with the Administration infrequently to discuss services. There are only about five members in NTK and their influence on TVT has not been great. TVT officials point out they are a small country, smallness discouraging formal groups and organizations.

Future Competitive Access

Competitive services will not be allowed in Sweden for the foreseeable future. Resale and shared-use restrictions will remain in strict adherence to CCITT regulations. There is the possibility that user augmented networks built on Televerket regulated services will be permitted such as electronic banking networks. In some cases this might apply only to Swedish national users.

One effect of the Nordic Inquiry could be a reduction in the number of U.S. international carriers providing certain new services (such as Teletex). This is not necessarily the intent of this inquiry but could be an effect which deserves attention. Televerket officials have interpreted the inquiry for us as follows:

> Sweden, in conjunction with the other Nordic countries, has initiated an inquiry among U.S. international carriers in order to obtain information on the development, rate of introduction, etc. of new services and their likely introduction on an intercontinental level. By setting up a process with recurrent inquiries Sweden and the other Nordic countries have established a means by which they will be able to choose the appropriate number of entries into the US telecommunications network corresponding to the size of the Nordic market for new international telecommunications services and to introduce such services in a timely and efficient manner.

Considering that the number of carriers will be linked to market size and that, as a practical matter, some officials feel that Sweden's difference in scale (smallness) doesn't justify multiple carriers, the effect could be fewer carriers for new services over the long run. On the other hand, if the market develops fast enough and new entrants are added before the earlier entrants preempt the market, then a similar number of carriers may result. Nonetheless, this process and structure is subject to the Televerket inquiry process and management.

Although no further wholesale policy changes providing greater competitive access are expected with respect to Swedish equipment markets, there has been selective liberalization of certain equipment since the new 1980 Act of Parliament. Further liberalization of modems is anticipated. As the country is a very small, although relatively open market, there is not a large available market to foreign producers. Instead, considering that Sweden has the highest penetration not only of telephones, but also of data communication and of radio mobile phones in Europe (and possibly the world) the country may be seen as a laboratory for products not possible to market as early in most other countries. The segregation of competitive and monopoly activities and a more positive attitude toward liberalization serve to enhance fair competitive access in Sweden equipment markets.

SWITZERLAND

Organizational Structure

The Swiss PTT has a constitutional basis in Article 36 of the Federal Constitution. The Swiss Confederation recognized, among other provisions, that all postal and telecommunication activities throughout its territory were its concern and that all receipts of the postal and telecommunications activities were to be received by the Confederate Exchequer. There are no plans in the near future to separate postal and telecommunication services.

The Swiss telecom system consists of 17 regional directorates. In addition, and by virtue of treaty, the principality of Lichtenstein is provided with telephone and telegraph services for a fee.

The 1922 Federal Telegraph and Telephone Act is the basis of the PTT's activities and authority. Control over the PTT is vested in the Federal Department of Transport, Communications, and Energy. The PTT is headed by three Directors-General, responsible to the Governing Board and supervised by the Federal Department of Transport, Communications and Energy. Its activities, especially in regard to telecommunications, are based on the Constitution, the 1922 Federal Telegraphs and Telephones Act (currently in the process of amendment) and related Orders.

General Directorate

The three departments which form the General Directorate are 1) the Postal Department, 2) the Telecommunications Department, and 3) the Presidential Department. The Director-General of the Presidential Department is President of the PTT General Directorate.

The Director-General of the Telecommunications Department directly controls the following organizational units:

- Telecommunications Services Directorate
- Research and Development Division
- Radio and Television Division
- Planning Studies, and International Service Group

The Telecommunications Services Directorate controls the:

- Telecommunications Engineering Division
- Telecommunications Operations Division
- Telecommunications Supplies Division
- TERCO Division (Telephone Rationalization using computers)
- General Services/Telecom Personnel.

In 1900, the PTT consisted of an approximate total of 14,000 people; by 1982 it had grown to 51,000 people, to become the largest Swiss employer. Of the latter total, approximately 15,500 are engaged in telecom work. Relations between the PTT and its employees are governed by a Federal Statute which spells out conditions of employment, working conditions, and the rights and duties of PTT employees. More than 90% of the PTT's employees are organized into trade unions and the trade unions hold 3 of the 15 seats on the PTT's management board. Proportion of total telecom expenditure for labor is 25% as compared with 75% for postal services.

Network and Services

The PTT currently provides the following public networks:

- telephone
- telex
- leased analog or digital circuits.

The first telephone network was opened in Zurich in 1880 as a private service by the Zurich Telephone Company; in 1886 the Swiss Confederation bought up the private network. During 1920, the postal, telegraph, and telephone administrations were combined into the PTT. The Swiss PTT retains monopoly control over domestic telecommunication services.

The number of telephone connections has multiplied 8 times since 1945. By the end of 1981, telephone density in Switzerland was 75 per 100 population (5 million subscriber stations), third highest in the world.

Long-distance traffic in Switzerland has been growing more rapidly than local traffic. During 1981-82 local growth was 3%; national long-distance 6.2%, and international 9 % (minutes).

In Switzerland, analog point-to-point circuits are available for practically all links. Since the digital network is still under construction, digital circuits are at present available only for about 30 percent of links, but this will increase as digitalisation of the network proceeds.

Data Services

The following public data-transmission networks are to come into service late 1982/early 1983:

- TELEPAC (switching network)
- DATEX-300 circuit switched network (300 Baud async)

Service Policies

Telecommunications policy is made by the PTT, which has produced a set of policy principles containing guidelines for services, management, organization, information, staffing, funding and R & D. The PTT has also established a master plan for communications which lays down medium-term PTT targets, together with the strategies for achieving them.

The PTT master plan for communications contains principles, assumptions, medium-term targets and strategies. The plan is based in particular on the following principles:

- The PTT is expected to work for the benefit of the community;
- The PTT has to provide fully satisfactory telecommunications services under the same conditions for the whole country and on economic principles;
- The PTT has to provide its services in accordance with the mandate conferred on it by law;
- In the communications sector, the PTT is responsible for the transmission of information but not for its content;
- The PTT retains responsibility for the public information transmission networks;
- The PTT must ensure unrestricted access to all the communications facilities it makes available;
- In its field of activity, the PTT must guarantee privacy;
- The PTT is aware that not everything technically achievable and economically viable will necessarily be beneficial for society; in its study of development trends it therefore considers the communications sector as a whole.

The purpose of the telecommunication networks is to make national and international telephone, telex, telegraph and data-transmission services equally available to all members of the public.

Monopoly Services

Only basic services are currently subject to public monopoly. No changes in the regulations are contemplated. The basic services are the telephone, telex and telegraph service.

Resale-Shared Use

Shared use, and resale of transmission capacity to third parties are not permitted.

Foreign Companies

There is no provision for foreign companies to participate in public telecommunications monopoly activities. The PTT can, however, award concessions to third parties (e.g. leased circuits) to carry out activities under the monopoly for their own purposes.

Leased Circuit Service and Policies

Leased circuits are provided by the PTT. However, the Swiss PTT believes that customers' requirements should be met through public networks. Very special needs are permitted to be satisfied through private networks until such time as public networks can meet the needs. A special digital network exists for all kinds of data transmission, connecting the most important places.

There are no plans for formal restrictive policy on the availability of leased circuits even when new data transmission networks have opened. Nonetheless, the Swiss PTT believes that customers' requirements should be met through public networks.

Circuits must not be leased for any purpose detrimental to the interests of the State, nor to compete with the public monopoly (bearing in mind that only the telephone, telex and telegraph services are public monopolies).

Waiting times are from two to six weeks on average, and not more than two to three months for an ordinary telephone line. However, the waiting time for a group can be as much as four to six months.

Leased circuits may not be connected to the public telephone network except in a few instances where there is some very good reason. Data network users will probably be allowed to connect them under certain conditions.

There are no plans for changing PTT policy in this respect. In international relations, only jointly decided changes could be considered.

Information Processing Policies

The Swiss PTT believes that control of information flow is a major problem but that problem, as of now, has not been approached by the Federal Government.

International Services Policy

As with most European PTTs, the Swiss PTT desires to supply standardized services which can be used internationally. It considers discussion of new services with the CCITT and CEPT as most important. However, services may be introduced independently of the CEPT if intended only to satisfy a national requirement. Such cooperation is desired since international telephone traffic shows a high activity with neighboring countries. The telephone traffic distribution to these countries is approximately:

U.S.	7%
Austria	6%
Germany	36%
Benelux	6%
France	18%
Italy	17%

Selected international telecommunication services are provided by Radio Suisse SA, 97% state-owned, which has been responsive to selective service innovation. With regard to international leased circuits availability or usage, only jointly decided changes will be considered.

Equipment and Interconnection Policies

Subscribers must use telephone sets and telex machines obtained from the PTT. Data-transmission modems are generally leased from the PTT, while (PTT-approved) terminals have to be purchased on the market. Telephone sets, exchanges and apparatus connected direct to the Public telephone network are provided by the PTT.

If the public telephone network is used for datatransmission, modems must be leased from the PTT. In other words, for data transmission, only PTT modems are permitted on the switched networks. However, privately supplied equipment terminals, facsimile, etc. may be used on leased lines and the public network. With regards to telex and low-speed (300 bps) datex networks, any data processing or special terminal can be connected via the PTT's DCE (Data Circuit Terminating Equipment).

Certain accessories (e.g., auto-dialers, recording/answering machinery, etc.) may be connected as private equipment, provided they have received appropriate type-approval.

The same applies to the telex and data-transmission networks.

Equipment to be connected to a leased circuit, or to the public network, must have PTT type-approval and its use must also be approved by the competent bodies.

No changes are expected in this policy.

Type Approval

All equipment directly connected to the public telecommunications network must have PTT type-approval. Heavy voltage equipment must also be officially approved (by the Association Suisse des Electriciens).

Standards are prescribed by the PTT, and available in the form of technical specifications. Manufacturers supply the PTT with apparatus or equipment for testing; in some cases they may be invited to enclose a record of tests in their own laboratory. Manufacturers are charged a registration fee and the actual testing costs.

The PTT performs maintenance and repairs to its own equipment. The subscriber has to make appropriate arrangements for the maintenance of private equipment.

PTT Procurement

PTT procurement policy is governed by a Federal Administration Procucrement Order dated December 8, 1975.

The Swiss PTT does not discriminate between equipment of Swiss and foreign origin. Requirements and procedures are the same. A foreign supplier must have a representative in Switzerland, listed in the Register of Commerce.

User Participation

User participation is mainly channeled through the PTT Advisory Conference. This represents the country's main economic groups, including users' associations, and discuss basic policy issues on such matters as services, innovations, rate structures, etc.

Prospective Changes

The PTT believes that the advent of new services, technical developments, or changes in legal provision might force reconsideration of present policies concerning equipment provisioning.

The PTT has been expected to exercise a more liberal policy with respect to subscriber equipment connected to their new packet switched network.

It is planned to make a broader range of telephone sets available, the influencing factors being public demand and market supply. It is uncertain whether this will provide for non-PTT telephone sets.

Importantly, a new Federal Telecommunications Act superseding the 1922 legislation is being considered.

Future Competitive Access

More liberal policies regarding user equipments for data service, facsimile, etc. are forthcoming. Domestic basic service provisioning will retain its monopoly status. It is not clear how non-basic services will be provided, whether via the PTT or other authorized entities.

No change in structure for providing international service is contemplated. Notwithstanding, the existing structure, albeit predominantly government owned, has been more open to new services than would occur under a classic monopoly situation. But this is constrained by domestic service interconnection and equipment policies.

UNITED KINGDOM

Organizational Structure

The organizational structure of telecommunications service in the United Kingdom has been changing significantly over the past two years. Until 1980 all telecommunications services were provided by the British Post Office monopoly. In that year the telecommunications functions were split away from the Post Office and vested in a separate government-owned company, British Telecom.

British Telecommunications (BT) is a public corporation established by an Act of Parliament (the British Telecommunications Act 1981). That Act grants BT the power to provide telecommunication services and data processing services and imposes a duty on it to provide these services throughout the UK. BT is therefore responsible for all day-to-day matters concerning the operation of these services but acts under the general control and supervision of the Secretary of State.

Responsibility for Policy Making

The responsibility for overall telecommunications policy lies with the Secretary of State for Industry and, through the Secretary of State, ultimately with Parliament. The Department of Industry's Telecommunications Division is therefore the central agency for the implementation of the Government's overall telecommunications policy although BT's pre-eminent position has naturally resulted in its making a major contribution to telecommunications policy.

Transition to Limited Competition

The British experience is one of introducing limited competition, not wide open competition. The present intent is to license only one other inter-city carrier, namely Mercury Communications. There are also important exceptions to their liberalized equipment interconnection policies.

One could say that competition in the UK has gotten off to a shaky start. Mercury has been denied a license for international service (these services generate almost 20% of British Telecom's revenues). Moreover, British Telecom balked at providing Mercury with connections to its local facilities. These restrictions almost led to the abortion of Mercury by its backers until the industry department in the last six months, forced British Telecom into conceding "the principle of connection." Presently, the Mercury people are satisfied with its license to provide international leased circuits and its interconnection agreements with BT. Consequently, competition has gotten a toehold in the U.K. and there is a present government commitment to making this British model work.

Mercury projects to begin service in London in spring 1983 and extended progressively to other parts of the country over the following two years.

Meanwhile, the threat of competition has had the effect of speeding up British Telecom's introduction of its "overlay" network to provide high-speed digital service. This network will begin service this fall in London and be extended nationally by 1986/87 offering circuit switched 64 kb/s service. Additionally, British Telecom has substantially reduced long distance telephone rates in anticipation of competition.

In other developments, a consortium of British Aerospace, GEC-Marconi and British Telecom, called United Satellites (Unisat) was formed to build a communications satellite system for television and telephone services. Launch is planned in 1986. BT intends to use the satellite to create an SBS type service in Britain, to Europe and potentially to the United States, via Intelsat (Unisat's beam will cover all of the eastern United States) through leased transponders. However, the latter prospect looks bleak, at this time.

Overall then, the current British industry is undergoing almost rapid change when measured against the status quo of 1979 but the fruits of that change have been slow in coming. BT will, for the foreseeable future, control 95% of all telecommunications service.

Service Policies

In general, service policies are rather straightforward. Leased lines are allowed so long as they are point-to-point. Resale, sharing and other like services are prohibited presently.

Public Switched Telephone Network

The Public Switched Telephone Network (PSTN) is provided by British Telecom (BT) for voice telephone service, which may be within the UK or to or from a foreign country. Some switching and transmission is provided for international traffic for which the UK acts as a transit center.

Access to the PSTN is via a customer's exchange line to the local exchange.

The conditions of use of the PSTN, and the other public and private networks provided by BT are presently laid down in a series of "schemes" which are made by BT and which determine tariffs, attachments, permitted usage, etc.

The Telex Network is provided by BT for telex service, and can be used for both national and international calls.

Access to the telex network is via an exchange line to the local telex exchange.

Conditions of use (and in particular connection of equipment) follow the procedures for the PSTN.

Data Services

The PSTN, the Packet Switched Service and leased circuits may be used for data communications.

Datel

Use of the PSTN for data transmission (Datel) was formerly by means of a separate BT supplied Data Modem. In general, this is no longer required: provided relevant standards are complied with, the modem may be integral to the terminal equipment or may be separate, and may also be privately supplied.

Packet Switched Service (PSS)

The Packet Switched Service is provided by BT for data transmission. It can be used to access the International Packet Switched Service for connection to packet networks in other countries.

Access may be via a data line to the packet exchange or by means of dial-up access via the PSTN.

Conditions of use (and in particular attachment of equipment) follow the procedures for the PSTN.

British Telecommunications Integrated Services Digital Network

The Integrated Services Digital Network will be provided by BT and is intended eventually to subsume all of the above networks--the PSTN, the Telex Network and the PSS.

It is intended to offer Integrated Digital Access to a number of services as part of the ISDN. Integrated Digital Access (IDA) will be provided to the ISDN normally using a modified local exchange line to a System X local exchange. IDA will provide access to circuit switched data services, packet switched data services and to digital private services. It will operate at a line speed of eighty kilobits per second which will provide one channel at sixty-four (64) kbps, one channel at eight (8) kbps and a signalling capability. The first channel may be used for either speech or data and the two channels may be operated independently.

Usage conditions (and in particular attachment of equipment) are likely to mirror existing practice on the PSTN. It is expected that the tariff structure will be cost-related and broadly similar to existing networks with a usage related charge for facilities which are not currently available.

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Leased Circuits

Private leased circuits (both national and international) are presently provided by BT. Connection of equipment to a private leased circuit is in line with the procedures outlined for the PSTN.

Private leased circuits may not normally be interconnected with a public network. The main exception to this is that a call incoming to a private branch exchange (PBX) may be extended over a single private leased circuit to an extension on another PBX. Outgoing calls from a PBX extension may not normally use a private leased circuit to another PBX and then into the PSTN.

Except where licensed by BT or the Secretary of State, private leased circuits may not be used for resale, provision of value added services or for shared usage. A number of such licenses have been issued to allow for particular applications where there was no suitable BT service, for example Viewdata, 'Mailbox' (an electronic mail service) and value added telex service.

No specific measures have been taken or are contemplated to encourage the use of BT's public network as against private leased circuits for data transmission. The pricing of private leased circuits is cost based and it is intended that both public networks and private charges and other terms and conditions applicable to that service are expressed in "Schemes' made and published by BT, but under general regulations contained in the British Telecommunications Act 1981.

The use of leased circuits will also be affected by the general license which has been granted by the Secretary of State for Industry under Section 15 of the British Telecommunications Act 1981. [See Value Added Network Services.]

Value Added Network Services (VANS)--General License

Under Section 15 of the British Telecommunications Act 1981 the Secretary of State may, after consultation with BT, grant a license for the running of any such telecommunication system as is specified in the license. The license may be granted to a single person, a class of persons, or generally to all persons. In addition to the license granted to Mercury Communications Ltd, a general license has been granted under this power to provide for the competitive supply of VANS over facilities owned by BT, and, eventually, Mercury.

The conditions of the General License require that systems:

1. must not be connected to each other except by means of a public telecommunications system;
2. must be comprised of apparatus approved under Section 16 of the British Telecommunications Act 1981;
3. must not be used to supply the service of passing messages to or from persons outside the United Kingdom and the Isle of Man by means of a private telecommunication circuit unless the messages relate solely to the affairs of the group for whom the circuit is leased.
4. The VANs operator will add value to the basic telecommunications service by either:

   -storing the message, (other than storage incidental to the conveyance of the message) or

   -altering the format or content of the message in some significant way, or

   -forwarding the message to two or more addresses.

Within the UK, VANs may be provided over public switched networks or leased circuits. VANs may also be provided over international switched networks, but may not be run over international leased circuits, except where the message relates to the business affairs of the company by whom or on whose sole behalf the circuit is leased. The license does not permit resale of facilities or capacity nor shared use of international circuits.

The license is intended to cover the operation of equipment used to provide inter alia the following services:

- Telephone answering using voice retrieval systems
- Store and retrieve message systems
- Viewdata
- Packet switching
- Speed and code conversion between incompatible terminals
- Text editing
- Deferred transmission
- Mailbox
- Word processor/facsimile interfacing
- Long term archiving

- User management packages eg accounting, statistics, etc.
- Multi address routing
- Customer data bases
- Protocol conversion between incompatible computers and terminals
- Telesoftware storage and retrieval
- Automatic ticket reservation and issuing

The license requires licensees to pay a fee of 100 pounds for the first 12 month period and 25 pounds for each succeeding 12 month period that they operate under the license, and to supply details of the system they run to the Secretary of State.

Other New Services

Text

A Teletex service is currently being introduced. When fully implemented it is intended that this will provide gateways to both the telex network and to the PSS; a number of electronic mail systems are being introduced.

Image

BT are undertaking trials of video conferencing and it is likely that a service (additional to the confravisision which has been in operation for some time) will be offered in the future.

Data

High bit rate digital private circuits are being marketed under the names of Kilostream and Megastream. These are mainly intended for data transmission, but may be used for any application requiring digital transmission at up to 140 M bits/s.

Satellite Services

A satellite service called SATSTREAM is being offered by BT. This will include the provision of business services via small dishes.

Broadband/Cable

The Government is considering the possible liberalization of Cable TV and the conditions which should apply. Eventually this could lead to a switched wideband network providing a wide range of local and national services.

BT had proposed that it should construct and operate the newly proposed nationwide cable television network. The plans call for the construction of this national cable network to begin in March of next year. The system recommended by the Prime Minister's Information Technology Advisory Panel (ITAP) calls for the laying of a national 30 channel two-way system to provide a wide range of information services in addition to regular and pay TV. However, the report of the Inquiry into Cable Expansion and Broadcasting Policy, chaired by Lord Hunt, does not recommend that BT should construct and operate a national cable television network. Rather, local consortia should build their own individual networks which could then interconnect with BT or Mercury for traffic outside their areas.

Provision of Telecommunications Services by Foreign Owned Firms

Although there is no formal legal barrier to the licensing of foreign-owned independent telecommunication carriers in the UK, the Government has no plans at present to grant further licenses, whether to foreign or UK owned firms, of the kind granted to Mercury Communications Limited.* However, under the terms of the general license for VANs, the Government claims that foreign owned firms are free to compete on equal terms in the provision of Value Added Network Services and in the supply of approved apparatus for connection to the networks. However, these terms forbid the use of international leased circuits for external services and may be considered a barrier to foreign-owned service providers.

Aside from VANs, and considering the expansion of cable services, satellite facilities and high-speed trunks, no foreign service providers need apply. The Government, in particular the home secretary Mr. Whitelaw and the industry secretary Mr. Jenkin and the information technology minister Mr. Baker have made it clear that new services are being introduced to stimulate the British high-technology industries.

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*Indeed, we understand that the Government has promised British Telecom and Parliament that no other intercity telephone network (outside of Mercury) will be licensed.

Equipment and Interconnection Policies

Equipment Policies

As part of last year's liberalization plan the BT monopoly over telephone instruments was reduced. However, BT still has the right to require that the first handset be obtained from them. Further, competition in the more sophisticated equipment areas such as PABXs, local area networks, etc., has been delayed until 1984.

The British Telecommunications Act 1981, requires that only approved apparatus be connected, directly or indirectly, to the public networks. In addition to this requirement BT will, as owner and operator of its networks, retain overall responsibility for ensuring that its networks are protected when connections are made. Where apparatus cannot be connected to the networks by a plug and socket arrangement (and in certain cases where this arrangement is used) individual consent must be obtained from BT before the apparatus may be connected. (BT's requirements for the connection of such apparatus form part of its operational rules and are not formal legal instruments.) Consequently, BT will continue to be major force in these matters. It is intended that there will be complete freedom to supply and install all apparatus on subscribers' premises except:

1. the first telephone or 'prime instrument';
2. network termination equipment directly connected to any exchange line; and
3. wiring between such termination equipment and the BT exchange or line plant.

All terminal equipment which is to be connected to the public networks must have been approved for connection. Approval is considered necessary in order to ensure apparatus is technically suitable for connection, will not damage the network or endanger those who work on it and that the apparatus is safe to use. There will be several methods by which apparatus can be approved but in most cases apparatus will be required to comply with an objective written standard which sets out the minimum technical requirements that apparatus must meet if it is to be connected to the public networks. Wherever it is possible, connection of privately supplied apparatus will be by 'plug and socket'. Other rules will apply in the case of more sophisticated apparatus.

Standard-Setting Responsibility

The standards for telecommunication apparatus are being written by the British Standards Institution and will be 'approved', that is given mandatory force, by the Government. The British Standards Institution (BSI) is an independent organization and is the recognized body in the United Kingdom for the preparation and promulgation of national standards in all fields. It is the United Kingdom Member body of the International Organization for Standardization (ISO) and the European Committee for Standardization (CEN). The BSI draws up standards by seeking agreement among all interested parties including the manufacturers of apparatus and its suppliers and users.

Approval Responsibility

Where standards have been written and have come into force, apparatus which has not previously been approved, including that which is to be supplied by BT, will have to be submitted for Type-approval to a newly-formed independent body, the British Approvals Board for Telecommunications (BABT). This body will arrange for the testing of samples in order to check their conformity with the appropriate standards. BABT will also examine manufacturing and quality assurance procedures in the factories where the apparatus is produced in order to satisfy itself that continuing production will be fairly represented by the test samples and will make regular surveillance visits, normally once a year. BABT will charge for its services. The cost will vary according to the nature of the apparatus but the cost for a single telephone is likely to be 3,000 pounds. Any supplier of apparatus (whether or not the manufacturer) will be able to apply to BABT for type approval provided that he is legally established in the UK. This type approval process will apply equally to apparatus manufactured in the UK and apparatus manufactured elsewhere.

Before any new approval is given to kinds of apparatus likely to be sold to members of the general public (including small business users) the approving authority will be required to satisfy itself additionally that the apparatus is safe to use, that is, that it meets the user safety requirements of the EEC "Low Voltage Directive."

Equipment Procurement

Procurement by the British Post Office has traditionally, favored British firms. Three British firms--General Electric Company, Standard Telephones and Plessey--control over 90% of the telephone equipment market. This situation is unlikely to change. However, it is only fair to say that, as a more private sector organization, BT will have somewhat more latitude in procuring its equipment wherever it chooses. Nonetheless, for the near term at least, it can be expected to be affected with a British interest. Also, it is committed to British products, e.g. System X, for its next generation switching and transmission needs.

The Mercury Network

Mercury Communications Limited is the independent organization operating under a license from the British Government as a second telecommunications carrier in the UK. Its transmission service is initially intended for organizations with substantial information handling needs, and will be offered first in London, then nationally through an inter-city network and internationally by satellite links (using BT for the necessary international negotiations).

Mercury Communications Limited is jointly owned by Cable and Wireless PLC (40%),*The British Petroleum Company PLC (40%), and Barclays Merchant Bank Limited (20%). Investment anticipated by the Consortium members in the earlier phases of the network is approximately 50,000,000 pounds.

The Mercury Network's local coverage will be provided by cellular microwave radio working from distribution nodes to aerials on customers' roofs. Multipoint local distribution at 64 kbits/s will be in the 10.5 GHz band with a range up to 10 km, while customers requiring a 2 Mbits/s service or above will be served by dedicated 13 GHz radio systems with ranges up to 25 km operating either via Mercury nodes, or directly between required locations. Nodes will initially be linked by microwave to enable a network to be commissioned as quickly as possible. The service covering the City and West End of London is planned to be operational in the second quarter of 1983. It will be followed in the third quarter by a microwave link to Birmingham, with an extension to Manchester by the end of the year.

Mercury intends to replace inter-city microwave with an optical fibre cable network covering England, with a southern loop incorporating Manchester and Liverpool. Spurs will meet specific user requirements. The cables will make use of wayleaves provided by British Rail, and the trunk network will link to local microwave distribution at or near city railway stations.

Mercury also intends to commission a transatlantic service to North American sites, communicating with an Intelsat satellite from an earth station in the London area. It is planned to open the international link very shortly after the London service is launched. (BT will carry out the necessary international negotiations.) Domestic satellite coverage will be used for access to areas of the UK not reached by the network, and to offshore structures.

Virtually any terminal device may be connected, and standard interfaces are provided for inter-computer, inter-PABX, and slow scan video working. Data channels will operate at any synchronous bit rate up to 64 kbits/s (asynchronously up to 2400 bits/s) and will accept any protocol.

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* The government owns 49% of Cable & Wireless PLC and 39% of British Petroleum. This would translate into an equivalent government ownership of Mercury of 35%.

The service will be organized in 'unit bearers' of 64 kbits/second, matching European standards for digital transmission including British Telecom's System X. Data is presented to the user as one or more 64 kbits/s or 2 Mbits/s bearers which can be sub-divided into a mix of voice and/or data streams or combined to provide very high speed, high capacity links. At the upper end, Mercury will provide lines with capacities of 34, 68 and 140 Mbits/s, meeting the needs of video transmission from the industrial level to the best broadcast standards.

Equipment at the user site will consist of a small enclosed rooftop antenna and TDM/TDMA radio linked to multiplexing equipment providing output channels to the customer's specification. Connection through a PABX or to leased lines will allow links to areas not currently served by Mercury, and to internal networks.

Tariff structures will include network access charges for each user site, together with a transmission charge which will primarily reflect the capacity provided. Total costs will be largely independent of distance, and will not include any usage element.

Information Processing Policies

Provision of data processing for third parties within a BT network requires a license from BT or the Secretary of State. The Secretary of State has issued a general license for the provision of "value added network services" which permits others to offer processing, storage, speed and protocol conversion, etc. [See under Services Policies.]

There is no British information processing policy, per se. There is no regulation of data processing firms or of data processing services save the licensing provisions above. In April 1982, proposals for legislation for data protection were made known.

Representation of User Interests

Also established by the 1981 Act of Parliament is the Post Office Users' National Council which is charged with the duty to represent the interests of the users of telecommunication (and Postal) services. The members of the Council are appointed by the Secretary of State for Industry in consultation with relevant bodies. BT is required to consult the Council before putting into effect any major proposal relating to any of its main services. The Council is financed by the Government.

In addition to this Council there are a number of non-statutory bodies representing the interests of different categories of users.

Prospective Changes

As a nationalized industry BT does not at present have direct access to financial markets. Its borrowing is controlled by Government and forms part of the Public Sector Borrowing Requirement. These borrowings have therefore to be subject to strict limits. Around 90 percent of BT's investment program has been self-financed, i.e. "customer financed"; BT's charges to customers not only cover current running costs, but are also paying for 90 percent of new investment. As a result, charges have risen steeply while investment is still not enough and the Government therefore believes that it is necessary to change the capital structure and ownership of BT and to provide a direct spur to efficiency; without which higher investment would mean still higher charges for the customer. To achieve this BT must be freed from the traditional forms of Government control.

Consequently, the Government intends to take the earliest opportunity to introduce legislation which, while keeping BT as a single enterprise, will enable it to be converted into a public company and allow the sale of shares in that company to the public. It is the Government's intention to offer up to 51 percent of the shares on the market in one or more offerings. Once half of the shares have been sold BT will be outside the public sector; its borrowing will cease to be subject to Exchequer control, and it will look to its shareholders and the markets for its external financing.

At the same time, the exclusive privilege of BT to provide telecommunications will be abolished and BT will be subject as all other telecommunication undertakings, including Mercury, to a license issued by the Secretary of State.

It is felt that these proposals flow naturally from the measures, described earlier, to allow for competition in the supply of telecommunication apparatus and services. Nevertheless, as far ahead as can be foreseen BT will continue to be the most significant influence in the British market for telecommunications for some years yet. The Government considers therefore that there will be a need for regulatory arrangements for the industry to balance the interests of those supplying telecommunications services, their customers, their competitors, their employees, their investors and their suppliers. There will therefore be established a new Office of Telecommunications under a Director General appointed by the Secretary of State. The Director General will operate with a degree of independence from Government. One of his duties will be to monitor the conditions of licenses to run telecommunications systems and to seek license amendments if these are required. It will be the Director General's job to ensure fair competition and fair prices.

VENEZUELA

Organization Structure

All telecommunications services both domestic and international within Venezuela are the responsibility of CANTV, a government owned public corporation. As in most of Latin America, the government owns the telecommunication monopoly and no competitive business services are allowed. Progress at CANTV and in Venezuelan telecommunications has not been good for seven or eight years as both internal (between engineers and appointed officials) and external (between the Administration and Congress) political problems have caused setbacks.

Overall telecommunications services in Venezuela are not good but major business users have been able to get good to excellent service. Repair response time, however, is often slow. The number of telephone lines per hundred inhabitants in Venezuela, as of 1980, was in the neighborhood of three, placing Venezuela in a class with countries such as Colombia and Mexico. Telecommunication services outside the metropolitan Caracus area are limited and services to areas outside of Caracus, Maracaibo, and Barquisimiento are inadequate (those three urban communities accounted for over 90% of all telephone subscribers in 1980). As a matter of fact, the national telephone system, in addition to being generally weak (a surprising fact in view of the relative wealth of Venezuela as a nation) may well have deteriorated through the 1970's [most likely due to the above-mentioned political problems].

New telephone installations require long lead times, and even in the urban areas the system quite regularly ceases to operate. The entire national system, including television and radio is under the direct supervision of the Ministry of Communications. While the Ministry, over the past few years, has developed plans to improve both local urban services, interurban services, and in the distant future rural services, there is little prospect of rapid improvement.

The government of Venezuela must, in the coming decade, take some steps to improve the quality of telecommunications services in Venezuela. Most likely, major improvements will first be made in urban local exchange services so as to meet the huge backlog in demand for those services. Second, priorities are increasingly focusing on facilitating rural areas and improvements to the intercity telecommunications network. For the foreseeable future, the government of Venezuela will be a rather minor customer for foreign manufactured telecommunications equipment.

A recognized weakness in Venezuela's telecommunication planning and development has been the lack of taking into account new technologies. The reason given for Cable TV, direct satellite reception, fiber optics and digital technologies, for example, as not being used in Venezuela today is the lack of foresight or knowledge by telecommunication planners five or ten years ago. The Directorate General of Communications is planning to correct this deficiency by undertaking a comprehensive telecommunications development study. Potential topics of major interest include:

- data transmission through private access circuits;
- telephone access to data banks;
- fiber optics;
- new public telephone services;
- remote medical servicing; and,
- the government's role in providing the appropriate regulatory basis for telecommunications use.

Service Policies

The service policies of CANTV are relatively simple. All services, such as they are, are provided by the government via the public switched network. Competitive services are not likely to be allowed in the near future. CANTV generally works with CCITT recommendations tailored to local needs. CANTV takes a dim view of any service or circuit use policy that threatens the loss of revenues. On this basis, CANTV is reluctant to allow the SWIFT international banking network to come to Venezuela.

Leased Circuits

Domestic and international leased circuits are permitted but interconnection with the public networks is not allowed in accordance with Venezuela law. Though some people would like to see greater use of public services, the inadequacy of public facilities and networks assures the continued availability of private networks.

Resale and Shared Use

As a general rule, no resale or shared use of circuits is permitted.

Data Transmission

Data transmission policies are very loose. Users can get dedicated lines for transmitting data. Specifications are lacking or incomplete.

Public data services are deficient. However, a new packet switching service is the study stage. A joint venture company is planned consisting of the supplier (a small capital share) local Venezuela firms and CANTV. An alternative being considered is the exclusion of a supplier interest with total ownership accounted for by CANTV and local interests.

Equipment and Interconnection Policies

As with many developing nations, Venezuela has a small indigenous domestic telecommunications equipment industry. The majority of both terminal equipment and network equipment has been either imported from Europe or North America or is manufactured by subsidiaries of U.S. corporations with plants in Venezuela. Recently, increased attention has been given to the promotion of local manufacture and assembly. Presently, all single line telephone instruments are prohibited from import. These are produced locally by Maplatex which is owned jointly by local interests and CANTV (40%).

Also, fully assembled PBXs are no longer permitted to be imported. A 60% duty has been imposed on key systems.

Aside from a primary instrument doctrine, business users can own and install their own telephones, PBXs, etc. that comply with government specifications (sometimes loosely defined).

Type-Approval

There is no formal type approval in Venezuela for equipment such as PBXs, key systems, etc. Equipment certification does not appear to be a problem although emphasis on local manufacture may raise difficulties for imported equipment in the future.

Information Processing Policies

The government of Venezuela has no national policy regarding information processing services. CANTV has the charter for these policies but has not yet formalized them. These will likely be addressed in the major development study planned. Most domestic information processing services are provided either in Caracus or Maracaibo. The lack of adequate facilities has held back the development of remote data processing services. Hence, information processing is provided either by corporations internally or by information processing vendors on a batch basis. There are currently no indications that the Government of Venezuela has any intention of either regulating or restricting information processing activities.

Future Competitive Access

In general, telecommunication facilities and services will remain a government monopoly although specialized services (such as the packet switching service) may allow participation by local private firms.

The equipment market faces a more restrictive environment due to promotion of local industry which involves, selectively, import restrictions or duties.

The outlook for competitive information services is unclear at this time.

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14. SUPPLEMENTARY NOTES

15. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

This study of 17 countries was conducted in an attempt to determine the extent to which each was moving toward competition in the provision of telecommunications and information products and services. Preliminary findings indicate that Japan is seriously considering a truly competitive telecommunications marketplace; however, no final decision has been reached. Australia is studying the possibility of adopting a somewhat more pro-competitive policy, primarily in the domestic market, but mounting opposition is emerging. Canada and the United Kingdom have already begun moving toward certain very limited forms of service competition. Most of the remaining countries in the study appear to favor the status quo. Some countries apparently wish to increase the role of the government monopoly. In those cases where there does exist some movement toward selective competition, the focus appears to be exclusively on the domestic market. Monopoly control of international service would be maintained.

16. Key Words *(Alphabetical order, separated by semicolons)*

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